

103
1890

HARVARD UNIVERSITY



Library of the
Museum of
Comparative Zoology

Bulletin of the Museum of Comparative Zoölogy

AT HARVARD COLLEGE

VOL. LXXIX, No. 1

SCIENTIFIC RESULTS OF AN EXPEDITION
TO RAIN FOREST REGIONS IN EASTERN AFRICA

I

NEW REPTILES AND AMPHIBIANS FROM EAST AFRICA

BY ARTHUR LOVERIDGE

CAMBRIDGE, MASS., U. S. A.

PRINTED FOR THE MUSEUM

FEBRUARY, 1935

No. 1.— *Scientific Results of an Expedition to Rain Forest Regions
in Eastern Africa*

I

New Reptiles and Amphibians from East Africa

BY ARTHUR LOVERIDGE

During 1933 and 1934, as a fellow of the John Simon Guggenheim Foundation, I was given the opportunity of investigating on behalf of the Museum of Comparative Zoölogy, the herpetological fauna of certain remnants of rain forest in East Africa. It is proposed to publish a series of reports dealing with the material which was collected incidental to the investigation. Certain of the specimens, however, were recognized in the field as being undescribed forms, two others were subsequently differentiated; it appears advisable to publish descriptions of these without further delay.

Full information as to altitudes, and other data concerning the type localities, will be published later in the Introduction to the reports. In the report dealing with Herpetology, more precise notes will be furnished as to the habitat, food, etc., of these new species.

Fortunately with only three exceptions, adequate series were obtained of all the new things described below. The actual numbers taken or utilized in the descriptions, together with the type localities, are as follows:

- 28 *Testudo pardalis babcocki* subsp. nov. Mount Debasien, Karamoja, Uganda.
- 1 *Typhlops kaimosae* sp. nov. Kaimosi, Kakamega, Nyanza Province, K. C.
- 62 *Natrix olivacea uluguruensis* subsp. nov. Nyange, Uluguru Mtns., T. T.
- 1 *Natrix olivacea pembana* subsp. nov. Pemba Island, Tanganyika Territory.
- 4 *Coronella semiornata fuscrosea* subsp. nov. foot of Mt. Mbololo, K. C.
- 6 *Aparallactus turneri* sp. nov. Sokoki Forest, near Malindi, K. C.
- 19 *Agama agama kaimosae* subsp. nov. near Kaimosi, Kakamega, K. C.
- 20 *Riopa tanae* sp. nov. Kau, near the mouth of the Tana River, K. C.
- 11 *Riopa mabuiiformis* sp. nov. Ngatana on the Tana River, K. C.
- 44 *Acontias percivali* sp. nov. foot of Mount Mbololo, Taita, K. C.
- 52 *Chamaeleon bitaeniatus altaeelsonis* subsp. nov. Kaburomi, 10,500 feet, Mt. Elgon, Uganda.
- 30 *Boulengerula taitanus* sp. nov. Mt. Mbololo at 4,800 feet, K. C.
- 3 *Arthroleptides dutoiti* sp. nov. Koitobos River, Mount Elgon, K. C.
- 75 *Hyperolius milnei* sp. nov. Witu, Coast Province, Kenya Colony.

The last is named in appreciation of the generous hospitality of Mr. R. D. Milne, who was not only my host but assisted me in hunting frogs during the five days which I spent near Witu.

The Arthroleptides is named after its discoverer, Dr. A. C. du Toit of Cape Town University, who visited the eastern slopes of the mountain when I was on the western. The occurrence on Mount Elgon of a member of this hitherto monotypic genus is of extraordinary interest and significance.

TESTUDO PARDALIS BABCOCKI subsp. nov.

Type. Museum of Comparative Zoölogy, No. 40,003. An adult ♀ from the western slopes of Mount Debasien, Karamoja, Uganda at 5,500 feet, collected by Arthur Loveridge, November 23, 1933.

Paratypes. Thirteen specimens in the Museum of Comparative Zoölogy from the following localities: **Kenya Colony:** Guaso Nyiro River; Meru River; Ithanga Hills; Wema, Tana River; Mount Mbololo, Taita. **Tanganyika Territory:** Arusha; Saranda; Pwaga; Tukuyu. **South Africa:** three without definite locality.

Fourteen specimens in the British Museum (N.H.) from the following localities: **Sudan:** Bahr el Gebel. **Uganda:** Mount Elgon between 9,000 and 10,000 feet. **Kenya Colony:** Ndogo, Lake Baringo. **Tanganyika Territory:** Mgana; "East Central Africa (Speke coll.)." **Mashonaland:** Mount Darwin. **Bechuanaland:** Magalapsi. **South Africa:** Algoa Bay; and five without definite locality.

Diagnosis. The southeast and east African Leopard Tortoise has long been confused with the typical form which was described by Bell as from "Promont. Bonae Spei." Fortunately Bell gave the length and depth of the type which places it within the range of the low-shelled form inhabiting southwest Africa. What was probably the type specimen, (which should be in the Zoölogical Museum, Cambridge, England,) was beautifully figured by Sowerby and Lear (1872, *Tortoises, Terrapins, and Turtles*, p. 3, pls. ix and x). Seven examples of the typical form and twenty-eight of the new form have been utilized in assessing the ranges of variation of the two forms.

Carapace high, the greatest height of shell being included in its greatest length from 1.61 to 2.07 times.

(South, East and Central Africa to the Bahr el Gebel). *T. p. babcocki*

Carapace low, the greatest height of shell being included in the greatest length from 2.02 to 2.62 times.

(Southwest Africa Protectorate and probably Cape Peninsula, as type locality is given as Cape of Good Hope) *T. p. pardalis*

It should perhaps be mentioned that only 2 of the 28 examples of the new form are shallower than 1.94 times. Both of these are British Museum measurements based on an adult (453 mm.) from Ndogo, Lake Baringo, Kenya Colony (2.00 times), and a juvenile (54 mm.) from Mgana, Tanganyika Territory (2.07 times); this last locality I have failed to locate on the maps available.

The average of height into length is 1.81 for the 28 examples of the new form as against 2.18 times for 7 specimens referred to typical *pardalis*. As, however, 4 of the latter are British Museum material with only "South Africa" for data they are somewhat arbitrarily assumed to be of the typical race.

Remarks. Ten years ago when I first saw two examples (adult of 302 mm., and young of 55 mm. long) of the Leopard Tortoise from Kolmanskop and Aroab in the Southwest Protectorate I was struck by the low vaulted shell as compared with that of the reptile with which I was familiar in East Africa. They form a parallel to *Kinixys belliana* of the savannah and the depressed *K. spekii* of the more arid districts.

Through the exceeding kindness of Mr. H. W. Parker, who has furnished me with detailed measurements and other particulars of all the Leopard Tortoises in the British Museum, I have become convinced that the high-vaulted type merits subspecific distinction and in designating it I am glad to associate the name of my friend Dr. Harold L. Babcock, author of "The Turtles of New England" and Curator of Reptiles in the Museum of the Boston Society of Natural History.

TYPHLOPS KAIMOSAE sp. nov.

Type. Museum of Comparative Zoölogy, No. 40,060 from Kaimosi Forest, near Friends' Africa Mission, Kakamega district, Nyanza Province, Kenya Colony, collected by Arthur Loveridge, March 7, 1934.

Diagnosis. Differs from *T. p. punctatus* and all other East African members of the genus *Typhlops* in possessing an ocular which is broadly in contact with the nasal shield *below* the preocular, thus separating the latter shield from the upper labials; no subocular as is present in *T. p. gierrai*.

Differs from *T. praeocularis* Stejneger of Leopoldville, Belgian Congo in the possession of 28 (instead of 24-26) midbody scale-rows; diameter of body being included in total length 43 (instead of 67) times; rounded snout (instead of with sharp cutting edge); habit; coloration.

Description. Snout prominent, rounded, without obtuse horizontal keel; nostrils inferior; rostral large, more than half the width of head, extending almost to the level of the eyes, which are distinguishable; nasal semidivided, the suture extending from the first labial to the nostril; preocular present, narrower than the nasal, not more than half as broad as the ocular which is in contact with the nasal below the preocular so as to broadly separate the preocular from the labials; ocular in contact with the third and fourth labials; four upper labials. Diameter of body 43 times in the total length; tail broader than long, ending in a spine. Midbody scale-rows 28.

Coloration. Above, uniformly black. Below, scarcely lighter than above except around the mouth and anus.

Measurements. Total length 215 mm.; head and body 211 mm.; tail 4 mm.; diameter at midbody 5 mm.

NATRIX OLIVACEA and its races

In 1925, and again in 1928, I drew attention to the fact that for the past forty years the common and widely-distributed Olive Water Snake was believed to possess invariably 19 longitudinal scale-rows at midbody. It is true that Fischer (1884, *Jahr. Hamb. Wiss. Anst.*, 1, p. 6) recorded an individual with 17 scale-rows from Masailand. Boulenger (1893, *Cat. Snakes Brit. Mus.*, 1, p. 227), possibly thinking it a case of misidentification, omitted this record from his synonymy so that it has passed into oblivion.

In the forested mountains of the Usambara, Uluguru and Rungwe there occurs a race with 17 scale-rows at midbody. Of sixty-three snakes collected by me in these mountains, no less than 89% possessed 17 scale-rows, the rest 18 or 19 except for one with 16. When reporting on some of these in 1928, Dr. Barbour and I refrained from describing this race until the opportunity occurred for securing an adequate series of the typical form (which was described from Tete, Mozambique) from the coast and savannah regions round about.

That opportunity occurred during my visit to East Africa last year, and I have been able now to assemble 94 specimens of the typical form, or their data, from all parts of the range. Omitting Fischer's record, as Masailand was a vague term applied to the country over which the Masai roamed and embracing several mountains, in all these 94 snakes only one (M. C. Z. 30,074 from Albertville, Belgian Congo) had 17 scale-rows while three from the Tana River had 18 (though these displayed 19 slightly in advance of mathematical

midbody). I propose, therefore, to designate the smaller montane form with 17 scale-rows as *Natrix olivacea uluguruensis*.

On the single example of the Olive Water Snake known from Pemba Island, however, there are only 15 scale-rows. As several mainland reptiles have distinctive races or representatives occurring on Pemba, I depart from my usual practice and designate this insular race *Natrix olivacea pembana* on the basis of a single specimen. It should be remembered that Pemba, unlike Zanzibar, is separated from the mainland by a channel of exceptional depth—400 fathoms; eight times the depth of the channel between Zanzibar and the adjacent coast.

The three forms of the Olive Water Snakes may be defined as follows:

Midbody scales usually in 19 longitudinal rows

(17 rows in only 1 specimen of 94 examined).

Tropical and South Africa *o. olivacea*

Midbody scales usually in 17 longitudinal rows (19

rows in only 7 specimens of 63 examined).

Uluguru, Usambara and Rungwe Mtns., Tanganyika. *o. uluguruensis*

Midbody scales in 15 longitudinal rows (only the type

specimen known.) Pemba Island *o. pembana*

NATRIX OLIVACEA ULUGURUENSIS subsp. nov.

Natrix olivaceus (part) Barbour & Loveridge, 1928, Mem. Mus. Comp. Zool., 50, p. 109; (part) Loveridge, 1933, Bull. Mus. Comp. Zool., 74, p. 231.

Type. Museum of Comparative Zoölogy, No. 23,117. An adult ♀ from Nyange, Uluguru Mountains, Tanganyika Territory, collected by Arthur Loveridge, October 8, 1926.

Paratypes. Sixty-one specimens from various localities in the Uluguru, Usambara and Rungwe Mountains as listed in the citations given above.

Description. Scales in 19 rows on nape immediately behind head, 17 rows at midbody, 17 rows at anus; ventrals 136; anal divided; subcaudals 74; labials 8, 4th and 5th entering the orbit; preocular 1; postoculars 3; temporals 1 + 2.

Measurements. Total length 350 (250 + 100) mm.

Remarks. This montane race attains smaller dimensions and lays fewer eggs than the typical form of the lowlands. See citations for further details.

NATRIX OLIVACEA PEMBANA subsp. nov.

Natrix olivacea (part) Loveridge, 1925, Proc. Zoöl. Soc. London, p. 71.

Holotype. Museum of Comparative Zoölogy, No. 19,112. A ♀ from Chakechake, Pemba Island, Tanganyika Territory, collected by Salimu bin Asmani, October 6, 1923.

Description. Scales in 17 rows on nape, 15 rows at midbody, 15 rows at anus; ventrals 127; anal divided; subcaudals 56; labials 8, 4th and 5th entering the orbit; preoculars 2; postoculars 3; temporals 1 + 2.

Measurements. Total length 288 (210 + 78) mm.

Remarks. This snake is discussed in detail in the citation given above.

CORONELLA SEMIORNATA FUSCOROSEA subsp. nov.

Type. Museum of Comparative Zoölogy, No. 40,555. An adult ♂ from the lower slopes of Mount Mbololo, Taita, Coast Province, Kenya Colony, collected by Arthur Loveridge, April 25, 1934.

Paratypes. Museum of Comparative Zoölogy, Nos. 40,556-7, being two females with the same data as the type. No. 40,554, a juvenile from near the station at Tsavo, Coast Province, Kenya Colony.

Diagnosis. The following key emphasizes the distinguishing characters of the new form.

Labials 8, 4th and 5th entering the orbit¹; preoculars 1, very rarely 2; olive or plumbeous above, white below usually each ventral scale so heavily edged with black as to present a plumbeous appearance.....*s. semiornata*

Labials 9, 5th and 6th entering the orbit; preoculars 2, rarely 1; bright brownish pink above, clear pink below...*s. fuscorosea*

Description. Snout not prominent, rostral much broader than deep; internasals as long as the prefrontals; frontal longer than its distance from the end of the snout, shorter than the parietals; loreal longer than deep (adults) or as long as deep (young); preoculars 2 (1 on left side of head in Nos. 40,554-5) the upper in contact with (or separated from) the frontal; postoculars 2; temporals 2+ 2 (2 + 3 on left side of head in No. 40,554); upper labials 9, the 5th and 6th entering the orbit; four lower labials in contact with the anterior chin-shields,

¹This was the case in *C. scheffleri* Sternfeld from Kibwezi, which is a synonym of *C. s. semiornata* for they agree in all respects. A topotype of *scheffleri* (M.C.Z. 40,553), however, has 9 upper labials, 5th and 6th entering the orbit on the left side of the head only, 2 preoculars on the right. This is the only intermediate in a very large series, or records, of *semiornata* examined.

which are as long (or longer) than the ill-developed posterior pair. Midbody scales in 21 rows; ventrals 181 (183-198 in paratypes); anal divided; subcaudals 96 (82-92 in paratypes).

Coloration. Above, uniformly bright brownish pink except for an ill defined dusky bar from the 5th and 6th labials across the frontal, a distinct one from the 8th and 9th labials across the parietals, and a well-defined, though shorter, one on the nape at a distance of 6 (or 5) scale-rows behind the parietals. Below, uniformly pink.

The paratype young one exhibits 64 faint bars or paired spots along the back.

Measurements. Type ♂. Head and body 472 mm., tail 186 mm. Paratype ♀ (M.C.Z. 40,556). Head and body 500 mm., tail 150 mm.

APARALLACTUS TURNERI sp. nov.

Type. Museum of Comparative Zoölogy, No. 30,117. A ♂ from Sokoki Forest, near Malindi, Coast Province, Kenya Colony, collected by H. J. Allen Turner, Esq., in June, 1932.

Paratypes. Museum of Comparative Zoölogy, Nos. 40,120-4 being five snakes from Peccatoni; Mkonumbi; and near Witu. All these localities being in Coast Province, north of the Tana River, south of Lamu Island and near the coast. Collected by Arthur Loveridge, May 24, 28, and 31, 1934 respectively.

Diagnosis. Very closely related to *A. werneri* Boulenger of the Usambara and Uluguru Mountains, Tanganyika Territory. It may be readily distinguished from that species by the fewer ventrals (120-139 as against 141-163 in *werneri*, the latter figures being based on scale counts of fifty specimens from seven localities, forty-three of the snakes are topotypes), different coloration, much smaller size (202 mm. maximum as against 354 mm. maximum).

Description. Diameter of eye greater than its distance from the oral margin; rostral twice as broad as deep, the portion visible from above not more than one-third its distance from the frontal; internasals much shorter than the prefrontals; frontal once and a half as long as broad, much longer than its distance from the end of the snout, as long as the parietals; nasal entire, in contact with the preocular; a single (a pair in all paratypes) postocular in contact with the anterior temporal; temporals 1 + 1; 6 upper labials, second and third entering the orbit; first lower labial in contact with its fellow behind the symphysial (barely in contact in No. 40,124); two pairs of chin shields, the anterior broader and a little longer and in contact with three lower

labials. Scales in 15 rows; ventrals 129 (120-139 in paratypes); anal entire; subcaudals 42 (31-37 in paratypes).

Coloration in alcohol. Above, head and nape black except for white blotches, one anterior, one posterior, to the eye, the second blotch larger and extending upwards on to the anterior temporal; also a narrow white color just posterior to the parietals so separating the black of the head from the black of the nape (in all paratypes there are vestigial indications of a second light color immediately posterior to the black of the nape); back uniformly pallid, slightly pinkish, brown with the edges of each scale darker (in all paratypes there is a fine, hair-like, black line along the vertebral row of scales to the end of the tail). Below, uniformly white except for a slight encroachment of the black nape patch in two downward-pointing patches.

Measurements. Type ♂. Head and body 140 mm., tail 35 mm. Largest specimen (M.C.Z. 40,120) also a ♂, head and body 167 mm., tail 35 mm.

AGAMA AGAMA KAIMOSAE subsp. nov.

Type. Museum of Comparative Zoölogy, No. 40,136. A ♂ from rocky heights three miles west of the Friends' Africa Mission Station at Kaimosi, Kakamega, Kenya Colony, collected by Arthur Loveridge, March 2, 1934.

Paratypes. Museum of Comparative Zoölogy, Nos. 40,137-40,150 and four unnumbered duplicates, being seven males and eleven females taken at the same locality as the type on March 2-9, 1934.

Diagnosis. Most nearly related to *A. a caudospina* Meek with a cotype of which it has been compared. It agrees with that race in the greatly depressed body and numerous other characters, but differs in the less developed spinosity of the tail and its bright pink color (yellow in *caudospina*) as well as in general coloration.

Midbody scale-rows 86 (range in paratype males 76-86, with an average of 81; in females 78-88, with an average of 83); preanal pores 11 (range 10-13, with an average of 11 for the eight males).

Coloration in life. ♂. Above, snout and crown of head brown overlying red; nape, back and two-thirds of upper arm, reddish buff with grey vermiculations; rest of arm and whole of hind limbs a brilliant, somewhat metallic, purplish blue; tail bright pink. Below, edge of jaws grayish white; throat dull red with purplish-mauve tones overlying gray vermiculations; breast pinkish purple; abdomen dull purple overlaid with brown; whole of undersurface of limbs bright

purplish blue; palms of hands as well as soles of feet and digits, grayish white; tail bright pink.

♀. Above, gray with irregular sepia brown markings along the vertebral line; plumbeous on limbs and sides. Below, throat grayish-white with gray vermiculations; limbs grayish-white except base of hind legs which are mustard yellow, as are the abdomen and underside of tail.

Measurements. Type ♂. Head and body 144 mm., tail 211 mm. Largest perfect paratype ♀. Head and body 113 mm., tail 152 mm. The largest ♂ and ♀ measure 148 and 133 mm. respectively in length from snout to anus but the tails of both specimens are truncated as is the case with more than half of the series.

RIOPA TANAE sp. nov.

Type. Museum of Comparative Zoölogy, No. 40,251. An adult ♀ from Kau, near the mouth of the Tana River, Coast Province, Kenya Colony, collected by Arthur Loveridge, June 4, 1934.

Paratypes. Museum of Comparative Zoölogy, Nos. 40,252-9 and six others all with the same data as the type; No. 40,261 from near Witu, just north of Kau; Nos. 40,262-3 from Golbanti, Tana River above Kau; Nos. 40,264-5 from Ngatana, Tana River above Golbanti.

Diagnosis. A very slender, attenuated species with small, pentadactyle limbs, the hind limb being included from $3\frac{1}{4}$ (young) to 6 (adult) times in the distance between the axilla and groin. A pair of supranasals form a suture separating the rostral from the frontonasal, nostril in a single nasal which forms a horizontal suture with the supranasal. Midbody scales smooth, in 22 to 24 rows.

Description. Snout but slightly depressed, not wedge-shaped as in *sundevallii* from the same region. Nostril in a single nasal which is separated from its fellow by a pair of supranasals; frontonasal broader than long; prefrontals present, widely separated; frontal as long (slightly longer and slightly shorter in some paratypes) as the frontoparietals and interparietal together, in contact with the 1st and 2nd supraoculars; parietals in contact behind the interparietal and each bordered along its posterior edge by 2 (left), 3 (right) or 4 (some paratypes) large scales; supraoculars 4; supraciliaries 8 (usually 7, rarely 6); loreals 2; preoculars 2; lower eyelid with a large, undivided opaque disk; upper labials 7 (8 in No. 40,253), 5th largest and below the eye (6th in No. 40,253 and on one side only in two others); ear-opening small, round, no larger than the nostril. Limbs very short,

pentadactyle, the adpressed anterior limb just reaching the ear (in adult and young); the length of the posterior limb is contained 6 times ($3\frac{1}{4}$ in young, the proportion varying regularly with age) in the distance between the axilla and groin. Fingers short, the 3rd a trifle longer than the 4th; toes short, the 4th a trifle longer than the 3rd (equal to, or shorter than, in some paratypes), the 5th extending as far forward as the 2nd, further than the 1st; 10 (or 9) lamellae beneath the 4th toe. Scales smooth, in 22 (or 24) rows; preanals 3, slightly enlarged.

Coloration in alcohol. Above, uniformly plumbeus, upper labials flecked with lighter; between the head and fore limb frequently several scales with light flecks (in life these were pale green and so arranged as to give the impression of vertical barring on the neck; only adult skinks, and not all of these, possess this barring). Below, throat and lower labials white heavily spotted with dark brown; belly grayish white but each scale with a dark spot; tail almost plumbeus as a result of the increase in size of these spots. (In some paratypes the spots on the belly and tail are arranged along the lateral edges of the scales so as to produce the appearance of 8 longitudinal lines along the underside from hind chin to anus).

Measurements. Type ♀. Head and body 89 mm., tail 58 mm., hind limb 11 mm., fourth toe 3 mm.

¹ RIOPA MABUIIFORMIS sp. nov.

Type. Museum of Comparative Zoölogy, No. 40,266. An adult ♂ from Ngatana, Tana River, Coast Province, Kenya Colony, collected by Arthur Loveridge, June 14, 1934.

Paratypes. Museum of Comparative Zoölogy, Nos. 40,267-71 and five others with same data as type but collected June 14-19, 1934.

Diagnosis. A very large Mabua-like species with well developed pentadactyle limbs, the hind limb being included from 2 (young) to 3 (adult) times in the distance between the axilla and groin. A pair of supranasals form a suture separating the rostral from the fronto-nasal, nostril so large as to nearly divide the single nasal shield, latter forming a horizontal suture with the supranasal. Midbody scales smooth, in 28 to 30 rows. Color of adults and young different.

Description. Snout neither depressed nor wedge-shaped. Nostril in a single nasal which is separated from its fellow by a pair of supranasals; frontonasal broader than long; prefrontals present, widely

¹ Note. This species differs from Riopa as defined by Boulenger in that the frontal is decidedly broader than the supraocular region.

separated; frontal *decidedly broader than the supraocular region*, as long as the frontoparietals and interparietal together, in contact with the 1st and 2nd supraoculars; parietals in contact behind the interparietal and each bordered along its posterior edge by 3 or 4 large scales; supraoculars 4 (5 on one side of No. 40,268 by subdivision); supraciliaries 8 (7 in seven paratypes); loreals 2; preoculars 2; lower eyelid with a large, opaque disk; upper labials 7, 5th largest and below the eye; ear-opening large with two small rounded lobules on its anterior border. Limbs well developed, pentadactyle, the adpressed anterior limb reaching well beyond the ear (in adult and young); the length of the posterior limb is contained 3 times (2 in young) in the distance between axilla and groin. Fingers long, the 3rd a trifle longer than the 4th; toes moderately long, the 4th longer than the 3rd by a claw length (in whole series), the 5th extending as far forward as the 3rd, much further than the 1st; 16 (or 15) lamellae beneath the 4th toe. Scales smooth, in 30 (or 28) rows; preanals with a median pair slightly enlarged.

Coloration in life. ♂ and ♀ adults. Above, uniformly plumbeous but on closer inspection each scale is seen to be lighter at its base, the light area tends to increase in size towards the tail so that the scales on the tail are light centered with dark edges; both upper and lower labials white, each barred with brown or black posteriorly; scales on the sides white, heavily edged with black on their posterior border. Below, uniformly white.

Young. Above, black, crown of head mottled with pale brown, occipital scale conspicuously white with dark centre; a vertebral stripe of pale brown, one scale in width, commences behind occipital scale and continues on to base of tail where it disappears, the vertebral stripe is flanked on either side by a dorso-lateral stripe of same color but two scales in width and commencing at the last supraocular; limbs uniformly black; tail transparent red, each scale edged with brown. Below, pure white, the internal organs visible through the scales; tail clear coral pink.

Measurements. Type ♂ and ♀. Head and body 95 and 91 mm., tail 141 and 121 mm., hind limb 22 and 20 mm., fourth toe 65 and 64 mm.

ACONTIAS PERCIVALI sp. nov.

Acontias meleagris Loveridge (not of Linné), 1923, Proc. Zoöl. Soc. London, p. 964.

Type. Museum of Comparative Zoölogy, No. 40,174. An adult ♀

(largest of forty) from the foot of Mount Mbololo, Taita Mountains, Kenya Colony, collected by Arthur Loveridge, April 26, 1934.

Paratypes. Museum of Comparative Zoölogy, Nos. 40,175-40,200 being thirty-eight specimens with the same data as the type. Also Museum of Comparative Zoölogy, Nos. 31,079-31,080 and three skins in the Coryndon Memorial Museum, Nairobi, collected at Voi near Mount Mbololo, by A. Blayney Percival in 1914.

Diagnosis. Only separable from *meleagris* (Linné) of South Africa by its shorter tail and coloration. According to Boulenger (1887, Cat. Snakes Brit. Mus., 3, p. 427) the tail of *meleagris* is "not more than one fifth of the total," it is included 6.1 to 6.3 times in the total length in examples from the Transvaal and Orange River Colony in the Museum of Comparative Zoölogy. In forty examples of *percivali* it ranges from 8.4 to 10 times (average exactly 9). In alcohol *percivali* has a very broad dorsal band of deep black while below it is pure white; there is no dark spot on each scale resulting in a lineolate or gray appearance as in *meleagris*.

It is important to note that the key character used by Boulenger to separate *meleagris* and *plumbeus* of Mozambique is inconstant though the two species are very distinct. In *percivali* about 25 specimens have the first supraocular larger than the second and third together, in 13 specimens it is equal to, in 3 possibly smaller. In the Museum of Comparative Zoölogy examples of *plumbeus* the first supraocular is as large as, or smaller than, the other two; in our *meleagris* it is as large as, or much larger than, the other two.

The range of *meleagris* is separated by 1,500 miles from that of *percivali*.

Description. Head conical; snout obtuse, projecting; ear hidden; rostral enormous, covering the greater part of the snout; mental enormous, its posterior border reaching to below the eye; frontonasal hardly half as long as the rostral, much shorter than the frontal, which is broader than long; supraoculars 3, the first much larger than the two others together (equal to the two others occasionally); supraciliaries 4 (on right) or 3 (on left); interparietal much narrower than the frontal, longer than broad (sometimes as broad as long), narrower than the parietals (rarely as broad as); no labials enter the orbit. Midbody scale-rows 18 (16, 17 or 18 in paratypes, average for forty-two skins 17.5) those of the two median dorsal rows transversely enlarged. A single, very large preanal plate. Limbs absent. Length of tail included 9.6 times in total length (8.4 to 10 times in paratypes).

Coloration in life. Both adults and young are glossy black above

except when about to shed the epidermis. At such times they are bluish gray above, a delicate pink below. Normally the young are reddish orange below, this shade sometimes persisting until they are two-thirds grown. Adults are pale chrome below; very occasionally an individual will be found with a brown centre to each lower scale resulting in the production of a faintly lineolate appearance. For coloration in alcohol see diagnosis above.

Measurements. Type ♀. Head and body 234 mm., tail 27 mm.

CHAMAELEON BITAENIATUS ALTAELGONIS subsp. nov.

Type. Museum of Comparative Zoölogy, No. 40,274. An adult ♂ from Kaburomi, 10,500 feet, on the western slopes of Mount Elgon, Uganda, collected by Arthur Loveridge, December 28, 1933.

Paratypes. Museum of Comparative Zoölogy, Nos. 40,275-40,300, being twenty one males and thirty females with the same data as the type.

Diagnosis. Most closely related to *C. b. höhnchli*, from which it is distinguished only by its smaller size. See remarks below.

Measurements. Type ♂. Head and body 78 mm., tail 73 mm. M.C.Z. 40,275, Paratype ♀. Head and body 75 mm., tail 73 mm.

Remarks. Kaburomi lies in the tree heath (*Erica arborea*) zone immediately below the alpine zone of Mount Elgon. On reaching it, I was immediately struck by the small size and different coloring of the chameleons as compared with those with which I was familiar at Sipi (circa 6,500 feet) and of which I had a good series, collected during the three weeks stay at Sipi.

Almost all our specimens from both places were adult and breeding. A tabulation of their measurements by sexes immediately shows that at Kaburomi these chameleons attain to about three-quarters the size which they do at lower levels.

| | |
|-------------------------------------|---------|
| Largest of 22 males from Kaburomi | 151 mm. |
| Largest of 22 males from Sipi | 199 mm. |
| Largest of 30 females from Kaburomi | 148 mm. |
| Largest of 30 females from Sipi | 190 mm. |

The explanation is doubtless to be found in the relative scarcity of insect life at the higher altitude coupled with the fewer hours for feeding. For we observed at 10,500 feet it was so cold that reptiles remained lethargic or sluggish until about 11 a.m. by which time the sun had dispersed the mist and warmed the atmosphere. The difference

in coloring was attributable to the altered character of the vegetation and different tones of color resulting therefrom.

Woosnam (in Boulenger, 1909, Trans. Zoöl. Soc. London, **19**, p. 245) noted a similar difference between the chameleons at 6,000 and 10,000 feet on Mount Ruwenzori. Speciation had gone further in this instance and Boulenger gave the upper zone form a name. It is now known as *C. b. rudis*, but is very different from the Elgon races. Parker (1932, Linn. Soc. Journ. Zoöl., **38**, pp. 227-9) refers the upper zone form from Mount Kenya at 14,000 feet to *C. b. schubotzi* Sternfeld, discusses the derivations of some of the races of *bitacniatus* and figures them.

BOULENGERULA TAITANUS sp. nov.

Type. Museum of Comparative Zoölogy, No. 20,001. An adult ♂ from the absolute summit, 4,800 feet, of Mount Mbololo, Taita Mountains, Coast Province, Kenya Colony, collected by Arthur Loveridge, April 14, 1934.

Paratypes. Museum of Comparative Zoölogy, Nos. 20,002-20,024, being twenty nine caecilians with the same data as the type except that they were taken from 4,000 feet to 4,800 feet and between April 14 and 24, 1934.

Diagnosis. In its large size and coloration resembling a *Scolecophorus* and totally unlike *Boulengerula* with which, however, it agrees in structural characters, possessing two rows of teeth in the lower jaw and a lateral tentacle situated above, and about midway along, the upper jaw.

Intermediate in number of annuli between *B. uluguruensis* Barbour & Loveridge and *B. changamwensis* Loveridge, agreeing with the former in the number of annuli but differing in that the tentacle is slightly nearer to the nostril than to the corner of the mouth, in *uluguruensis* this position is reversed. *B. taitanus* differs from *changamwensis* both in number of annuli and in position of the tentacle. It differs from both in size and coloration. The young, however, agree in color.

Description. Habit moderate, vermiform. Snout obtusely pointed, projecting far beyond the lower jaw; eye indistinguishable; tentacle round, exsertile, with indications of a circular groove surrounding it, situated rather nearer to the nostril than to the corner of the mouth; 26 or 28 teeth round the upper jaw; 146 annuli (136-148 in the paratype series), these annuli are interrupted in the middle dorsal line except on the nape and posteriorly.

Coloration in life. Type ♂. Above, glossy black, each annular ring blue gray except along the vertebral line. Below, blue gray blotched with brown, except for the throat which is uniformly pink; the circumanal area is pale blue gray.

Very young specimens are flesh pink like adults of *changamwensis*. Immediately after being chloroformed they turn gray above, but remain pink below.

Coloration in alcohol. Type ♂. Generally plumbeous but the gray blue and pink areas become white.

Measurements. Type ♂. Total length 355 mm., midbody diameter 7 mm. Paratypes. Total lengths 73-360 mm., midbody diameters 1.8-7 mm. Diameters included in total lengths from 40.5 to 53.3 times.

ARTHROLEPTIDES DUTOITI sp. nov.

Type. Museum of Comparative Zoölogy, No. 19,864. An adult, gravid ♀ from the Koitobos (Koitobross) River, eastern slopes of Mount Elgon, Kenya Colony at about 7,200 feet, collected by Dr. A. C. du Toit, January 8, 1934.

Paratypes. No. 150 of du Toit collection. An adult ♂ and young specimen with the same history as the type.

Diagnosis. This very distinct little frog may be readily distinguished from the only other member of this hitherto monotypic genus as follows:

Toes half-webbed; buccal margin scarcely flattened, the orbits projecting beyond it when viewed from above. Color below, light violet brown slightly or moderately flecked with white. Adult ♀ 31 mm. *dutoiti*

Toes with only a rudiment of web at their base; buccal margin strongly flattened, extending well beyond the orbits when viewed from above. Color below, white, at most the throat violet brown in males. Adult ♀ 59 mm., ♂ 74 mm. *martiensseni*

Description. Vomerine teeth absent. Head slightly broader than long; snout subacuminate, not depressed as in *martiensseni*; canthus rostralis sharply defined; loreal region concave; nostril equidistant between end of snout and anterior border of orbit; tympanum distinct, not quite two-thirds the diameter of the eye; interorbital space about equal to the width of an upper eyelid. Tips of fingers and toes strongly dilated, the disks having a median groove; digits without web; toes

half-webbed the membrane extending as a narrow fringe to the disk of the 1st, 2nd and 5th toes on their inner margin, almost to the disk on the 3rd, the disk and two distal joints of the 4th toe free of web; the tibio-tarsal articulation of the adpressed hind limb reaches slightly beyond the tip of the snout (well beyond in the ♂).

Skin above rugose (corrugated and distinctly warty in the ♂) pitted. In *martiensseni* the skin is smooth, how far preservation may have accentuated these differences it is difficult to say.

Coloration in alcohol. (After formalin preservation in the field). Above, uniformly black except for the digital expansions which are more or less white-edged. Below and posterior aspect of thighs, light violet brown slightly flecked with white in the type, rather more abundantly flecked and mottled in the paratypes.

| <i>Measurements.</i> | ♀ Type | ♂ Paratype | Young Paratype |
|---------------------------|----------|------------|-------------------|
| Length from snout to anus | 31 mm. | 25 mm. | 10.5 mm. |
| Breadth of head | 12.5 mm. | 10.5 mm. | 4.5 mm. |
| Length of head | 10.5 mm. | 9 mm. | 4 mm. |
| Length of hind limb | 59 mm. | 50 mm. | 15.5 mm. |
| Length of fourth toe | 13.5 mm. | 11.5 mm. | 3.5 mm. |

HYPEROLIUS MILNEI sp. nov.

Type. Museum of Comparative Zoölogy, No. 20,025. A gravid ♀ from Witu, Coast Province, Kenya Colony, collected by Arthur Loveridge, May 31, 1934.

Paratypes. Museum of Comparative Zoölogy, Nos. 20,026-20,050 being seventy-four frogs with the same data as the type. Nos. 20,051-2 from Golbanti, Tana River and No. 20,053 from Malindi, all near the coast in Coast Province, Kenya Colony.

Description. A small species of stouter build than its allies of the *parkeri-usaramoae* group. Snout obtusely acuminate (not sharply pointed); distance from the end of the snout to the nostril equal to two-thirds the distance from nostril to anterior border of the eye; distance from the end of the snout to the anterior border of the eye longer than the orbital diameter; tympanum hidden. Fingers one-third webbed; 1st, 2nd, 3rd and 5th toes are webbed to the disk (or practically to the disk) on their inner aspect, on the 4th toe the disk and last two phalanges are free of web. The tibiotarsal articulation of the adpressed hind limb reaches to the eye (in females, to the nostril in only one female) or to the nostril (in males, very occasionally falls

short). Skin smooth above, granular on the belly, no strong fold across the chest. Males with a large subgular vocal sack and strongly granular disk.

Coloration in alcohol. Above, white, a dusky line from end of snout through nostril to orbit, a black spot on upper eyelid, half-a-dozen scattered, irregularly disposed, black spots on anterior portion of back (maximum number of spots about 20 in Malindi paratype; these spots are entirely absent in many paratypes, principally males), a similar spot on knee and elbow (often absent); in addition there are numerous, minute, reddish-brown flecks on top of head, back, fore arm and tibia; thighs colorless. Below, transparently white, internal organs visible through the skin.

Coloration in life. Above, an unusual shade of cabbage green, a black canthal line through nostril to orbit, a number of irregularly disposed, black spots on head and back in addition to numerous reddish-brown flecks on top of head, back, fore arm and tibia; thighs colorless; a broad, but indistinct, subdermal band of palest yellow from eye to flank present in males but not observed in females; fingers and toes orange. Below, semi-transparent, throat greenish in ♀, the eggs and internal organs showing distinctly, intestines imparting a greenish tinge to the sides; throat and breast pure white in ♂ with a certain amount of green or greenish blue periphally.

| | ♀ | ♂ |
|---------------------------|---------------|---------------|
| <i>Measurements</i> | M.C.Z. 20,025 | M.C.Z. 20,026 |
| Length from snout to anus | 20 mm. | 21.5 mm. |
| Breadth of head | 7 mm. | 7.25 mm. |
| Length of head | 7 mm. | 7.25 mm. |
| Length of hind limb | 30 mm. | 31 mm. |
| Length of fourth toe | 6 mm. | 6.5 mm. |

Bulletin of the Museum of Comparative Zoölogy

AT HARVARD COLLEGE

Vol. LXXIX, No. 2

SCIENTIFIC RESULTS OF AN EXPEDITION TO RAIN
FOREST REGIONS IN EASTERN AFRICA

II

CRUSTACEA

BY MARY J. RATHBUN

WITH TWO PLATES

CAMBRIDGE, MASS., U. S. A.

PRINTED FOR THE MUSEUM

JULY, 1935

No. 2. — *Scientific Results of an Expedition to Rain Forest Regions
in Eastern Africa*

II

Crustacea

By MARY J. RATHBUN

The expedition produced two new species of *Potamon*, both of the *Geothelphusa* type. Also a specimen of *Palaeomon delagoae* Stebbing previously known only from the type locality at the southern end of Portuguese East Africa.

BRACHYURA

POTAMONIDAE

POTAMON (GEOTHELPHUSA) HARVARDI spec. nov.

Plate 1

Type ♂ (M. C. Z. 8241) Sipi, W. Mt. Elgon, Uganda, 6000 ft. 18.XII. 33.

Figured ♂ (M. C. Z. 8242), same data.

19 ♂ 6 ♀ (M.C.Z. 8243), do.

1 ♂ 1 ♀ ovigerous (M.C.Z. 8240) Kaburomi, Mt. Elgon, Uganda. 28.XII. 33.

34 ♂ 28 ♀ 6 juv. (M.C.Z. 8244, 8245) Kaimosi, Kakamega, Kenya Colony. 10–15. II.34.

This species belongs to the group of *P. (G.) granviki* Colosi¹ and *P. (G.) antheus* Colosi². Carapace covered with coarse punctae. Antero-lateral margin narrowly but smoothly indicated; postero-lateral margin roughened with short, oblique rugae. Carapace deeply furrowed about the cardiac and posterior mesogastric region; a deep sulcus runs from the posterior cardiac region along the posterior margin of the branchial region. Cervical groove shallow, incomplete, ending forward in a row of coarse punctae directed toward the post-orbital pit. Epigastric lobes prominent and widely separated; tip of

¹ 1924, Arkiv för Zoologi, Stockholm, 16 (1) p. 16, text fig. 11, pl. 1, fig. 5.

² 1920, Boll. Mus. Zool. ed. Anat. comp., 35, p. 35; 1924, Arkiv för Zoologi, Stockholm, 16 (1), p. 17, text fig. 12.

mesogastric region roof-shaped. A faint, blunt ridge behind and adjacent to the orbit; a deep, narrow groove between the ridge and the orbital rim; the ridge fades out just beyond the outer angle of the orbit; in the triangle thus formed there is a well marked pit (pl. 1, fig. 4). The front, measured across the middle of its depth is $\frac{1}{3}$ as wide as the carapace; its margin is broadly shallow at middle and its sides are distinctly oblique. Chelae similar to those of *granviki* (fig. 11c) but narrower and more elongate. Merus of outer maxillipeds broader than long, the outer anterior angle prominently rounded. Groove on ischium nearest inner margin, very distinct but short. Anterior end of sternum akin to that of *antheus*¹; space in front of groove 5 times as wide as long, not counting the narrow point between maxillipeds. Groove at base of chelipeds longer than in *granviki*, about $1\frac{1}{2}$ times as long as the distance from the groove to the median line; in *antheus* the groove extends across the sternum. Distal end of sixth segment of male abdomen $1\frac{1}{2}$ times as long, proximal end twice as wide as long.

Measurements.

- Length of carapace of male 30 mm.
- Width of carapace 42.8
- Width of front below 13.3
- Width of front above 16
- Length of major propodus of cheliped 46
- Length of major palm at middle 30
- Width of major palm at highest point 19
- Length of minor propodus 33.2
- Length of minor palm at middle 18.7
- Width of minor palm at highest point 11.

POTAMON (GEOHELPHUSA) PERPARVUS Rathbun

Potamon (Geothelphusa) perparvus Rathbun, 1921, Bull. Amer. Mus. Nat. Hist., **43**, p. 425, pl. xxviii, fig. 2; pl. xxx; text fig. 12: Stanleyville, Belgian Congo.

1 ♂ 2 ♀ (1 with young) (M.C.Z. 8239) Kaimosi, Kakamega, Kenya Colony. 10-15.II.34.

¹ 1920, Boll. Mus. Zool. ed. Anat. comp., **35**, p. 35; 1924, Arkiv för Zoologi, Stockholm, **16** (1), p. 17, text fig. 12

POTAMON (GEOTHELPHUSA) AMALERENSIS spec. nov.

Plate 2

5♂ 5♀ 1 juv. (M.C.Z. 8237 holotype, 8238) Amaler River, Mt. Debasien, Uganda. 5000 ft. IX.33.

Near *P. (G.) berardi*. Carapace wider. Epigastric lobes oblique, separated feebly from the postorbital ridge which is sinuous, being more advanced behind the inner half of the orbital rim; the ridge unites with the lateral border of carapace at an obtuse angle; it is serrate at the outer end and is continued downward and inward with a round turn to the outer margin of the orbit. Frontal margin divided into two shallow lobes, sides oblique. Lateral margin of carapace finely serrate. Mesogastric region with anterior end roof-shaped; behind this region two deep triangular depressions; short deep furrows either side of cardiac region converge slightly backward. Sides of carapace with rows of short oblique striae. Chelipeds of male unequal, minor palm about $\frac{2}{3}$ as high as major; the major manus is stout, convex below; its fingers gape narrowly and bear uneven teeth. Merus of outer maxilliped similar to that of *berardi*.

Measurements.

Length of carapace of male holotype 17.4 mm.

Width of carapace 25.5

Length of carapace of female 20.5

Width of carapace 31.

POTAMON (GEOTHELPHUSA) BERARDI (Audouin)

Thelphusa berardi Audouin, 1826, Expl. Somm. Plates by Savigny, in Desc. de l'Égypte. Hist. Nat., **1**, pt. 4, p. 82 (pl. 2, fig. 6 of Savigny).

Potamon (Geothelphusa) berardi, Rathbun, 1905, Nouv. Arch. Mus. Hist. Nat., Paris, **7**, p. 203; **6**, pl. xviii, fig. 3 and 10, and synonymy.

26♂ 17♀ (M.C.Z. 8235) Butandiga, Mt. Elgon, Uganda. 8.I.34.

40♂ 42♀ (13 ovig.) (M.C.Z. 8236), Elgonyi, Mt. Elgon, Kenya Colony. 7000 ft. 25.I.34.

POTAMON (ACANTHOTHELPHUSA) NILOTICUS (Milne Edwards)

Thelphusa nilotica H. Milne Edwards, 1837, Hist. Nat. Crust., **2**, p. 12: The Nile.

Potamon (Parathelphusa) niloticus Rathbun, 1905, Nouv. Arch. Mus. Hist. Nat., Paris, **7**, p. 263, pl. xii, fig. 15.

Potamon (Acanthothelphusa) niloticus Rathbun, 1933, Bull. Mus. Comp. Zoöl., Cambridge, **75**, p. 258 and synonymy.

1 ♀ ovig. (M.C.Z. 8234) Kaimosi, Kenya Colony. III.34.

POTAMON (POTAMONAUTES) DIDIERI Rathbun

Potamon (Potamonautes) didieri Rathbun, 1905, Nouv. Arch. Mus. Hist. Nat., Paris, **7**, p. 170; **6**, pl. xiv, fig. 9: Belgian Congo.

4♂ 1 ♀ 2 juv. (M.C.Z. 8226) Butandiga, Mt. Elgon, Uganda. 8.I.34.

3♂ 5 ♀ (M.C.Z. 8227) Elgonyi, Mt. Elgon, Kenya Colony. 7000 ft. 25.I.34.

POTAMON (POTAMONAUTES) HILGENDORFI (Pfeffer)

Telphusa suprasulcata Hilgendorf, 1898, Deutsch-Ost-Afrika, **4**, p. 8, pl., fig. 5-5d: On the way to Kilimanjaro.

Potamon (Potamonautes) hilgendorfi Rathbun, 1933, Bull. Mus. Comp. Zoöl., Cambridge, **75**, p. 256 and synonymy.

2♂ (M.C.Z. 8228) Mt. Mbololo, Taita, Kenya Colony. IV.34.

1 juv. (M.C.Z. 8229) Amaler River, Mt. Debasien, Uganda. 5000 ft. IX.33.

POTAMON (POTAMONAUTES) BOTTEGOI de Man

Potamon (Potamonautes) bottegoi de Man, 1898, Ann. Mus. Civ. Genova (2) **19**, p. 262 [3], pl. iii; Rathbun, 1933, Bull. Mus. Comp. Zoöl., Cambridge, **75**, p. 258.

1 ♀ (M.C.Z. 8230) Amaler River, Mt. Debasien, Uganda. 5000 ft. XI.33.

1♂ (M.C.Z. 8231) Mombosasa, near Witu, Kenya Colony. V.34.

3♂ 3 ♀ (M.C.Z. 8232) Voi, Kenya Colony. 7.IV.34.

1 ♀ (M.C.Z. 8233) opposite Kilindini, Kenya Colony. 6.VII.34.

OCYPODIDAE

OCYPODE KUHLLI de Haan

Ocypode (Ocypode) kuhlii de Haan, 1835, Fauna Japon., Crust., Dec. 2, p. 58.
Ocypode kuhlii, Rathbun, 1933, Bull. Mus. Comp. Zoöl., **75**, p. 260, pl. vii.

1♂ (M.C.Z. 8248) Lamu Island, Kenya Colony. 7-12.IV.34.

1♂ (U.S.N.M.) Kitau, Manda Island, Kenya Colony. V.34.

2♂ (M.C.Z. 8249) Malindi, Kenya Colony. VI.34.

UCA INVERSA (Hoffmann)

Gelasimus inversus Hoffman, 1874, Crust. Echinod. Madagasc., p. 19, pl. iv, fig. 23-26; De Man, 1891, Notes Leyden Mus., **13**, p. 44, pl. iv, fig. 12.

1 ♂ (M.C.Z. 8251) Gongoni, Kenya Colony. 27.IV.34.

GECARCINIDAE

CARDISOMA CARNIFEX (Herbst)

Cancer carnifex Herbst, 1796, Naturg. Krabben und Krebse, **2**, p. 163, pl. xli, fig. 1: "Trankenbar."

Cardisoma carnifex, Latreille, 1825, Eneycl. Méthod., **10**, p. 685.

1 ♂ 2 ♀ (M.C.Z. 8252) Kitau, Manda Island. V.34.

ANOMURA

COENOBITIDAE

COENOBITA RUGOSUS Milne Edwards

Coenobita rugosa Milne Edwards, 1837, Hist. Nat. Crust., **2**, p. 241: Indian Ocean.

Coenobita rugosus, Alcock, 1905, Catal. Indian Dec. Crust., Part II. Anomura, Fasc. 1. Pagurides, p. 143, pl. xiv, fig. 3, 3a, and synonymy.

1 ♂ 1 ♀ (M.C.Z. 8254) Opposite Kilindini. 6.VII.34.

COENOBITA RUGOSUS var. JOUSSEAUMI Bouvier

Coenobita rugosa var. *jousseaumi* Bouvier, 1890, Bull. Soc. Philom., Paris (8) **2**, p. 146: Aden.

1 ♂ (M.C.Z. 8253) Lamu, Lamu Island, Kenya Colony. V.34.

MACRURA

PALAEMONIDAE

MACROBRACHIUM PATSA (Coutière)

Palaemon (Parapalaemon) patsa Coutière, 1899, Bull. Mus. Hist. Nat. Paris, **7**, p. 383: Madagascar. 1901, Ann. Sci. Nat., Zoöl., **12**, p. 284, pl. 11, fig. xx-xxii.

1 ♀ (M.C.Z. 8255) Tsavo, Kenya Colony. 2-4. IV.34.

PALAEMON (PARAPALAEMON) DOLICHODACTYLUS Hilgendorf

Palaemon (s.s.) *dolichodactylus* Hilgendorf, 1878, Monatsb. d. K. Akad. Wiss. Berlin, p. 840, pl. iv, fig. 18: Mozambique.

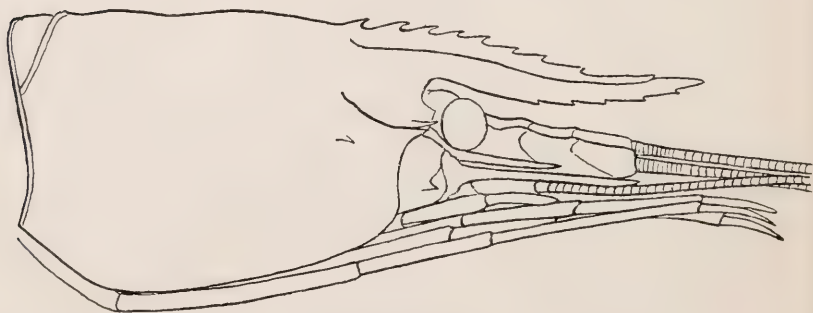
2 ♀ (M.C.Z. 8256) Ngatana, Tana River, Kenya Colony. VI.34.

PALAEMON DELAGOAE Stebbing

Text figures 1 and 2

Palaemon delagoae Stebbing, 1912, Ann. South Afr. Mus., **15**, p. 74 pl., 80: Delagoa Bay, Portuguese East Africa.

1 ♀ (M.C.Z. 8257) Ngatana, Tana River, Kenya Colony. VI.34.



Palaemon delagoae

Fig. 1. Carapace and appendages (cheliped lacking), lateral view, x 2.

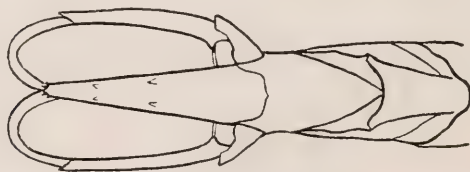


Fig. 2. Three segments of abdomen and appendages, dorsal view, x 2.

The specimen is soft shell and lacks chelipeds. It is larger than the type, the carapace measuring 43 mm. long and telson 14.

EXPLANATION OF PLATES

PLATE 1

PLATE 1

Potamon (Geothelphusa) harvardi ♂ type

- Fig. 1. Dorsal view, nat. size.
- Fig. 2. Ventral view, showing chelae, nat. size.
- Fig. 4. Frontal view, showing front, eyes and anterior end of maxillipeds,
x $1\frac{1}{2}$.
- Fig. 5. Ventral view, showing front part of sternum, x 2.
- Fig. 6. Ventral view, for abdomen, x $1\frac{1}{2}$.
- Fig. 3. Ventral view of smaller specimen, ♂ (M.C.Z. 8242) nat. size.

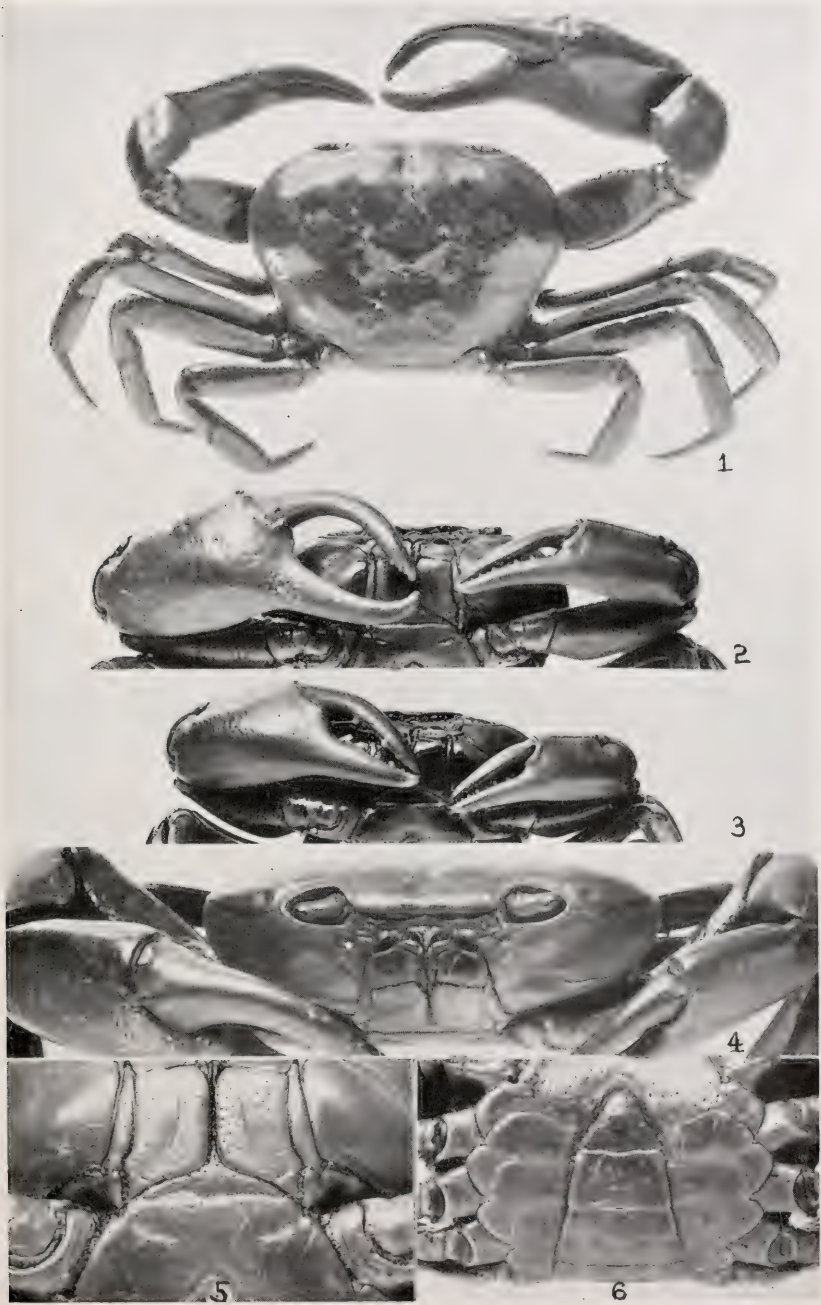
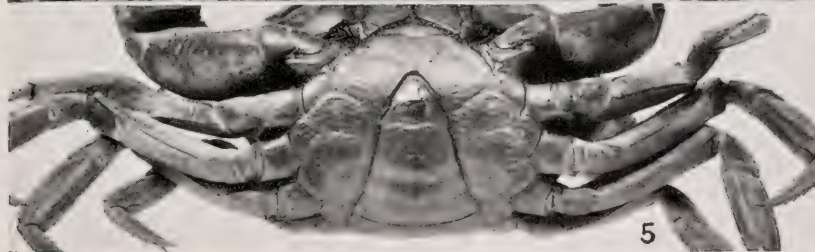
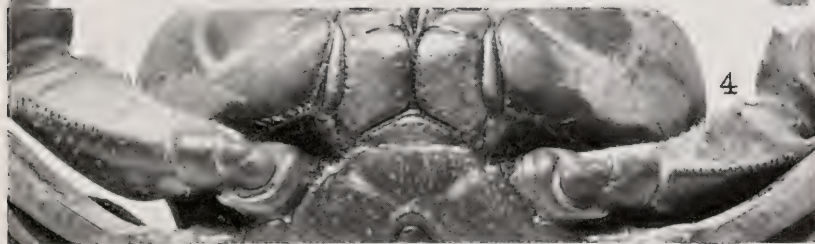
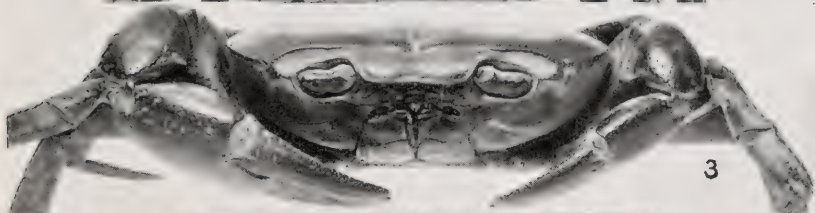
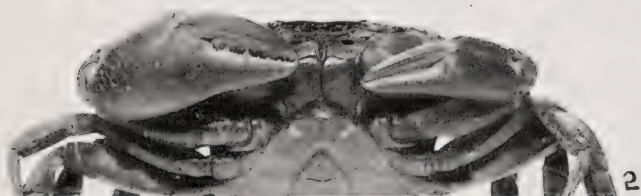


PLATE 2

PLATE 2

Potamon (Geothelphusa) amalerensis ♂ holotype

- Fig. 1. Dorsal view x $1\frac{1}{2}$.
- Fig. 2. Ventral view, showing chelipeds, x $1\frac{1}{2}$.
- Fig. 3. Frontal view for eyes, groove behind eyes and anterior end of maxillipeds, x 2.
- Fig. 4. Ventral view for front part of sternum, x 3.
- Fig. 5. Ventral view for abdomen, x 2.



Bulletin of the Museum of Comparative Zoölogy
AT HARVARD COLLEGE
VOL. LXXIX, No. 3

SCIENTIFIC RESULTS OF AN EXPEDITION
TO RAIN FOREST REGIONS IN EASTERN AFRICA

III

MAMMALS

BY GLOVER M. ALLEN AND BARBARA LAWRENCE

WITH FIELD NOTES BY
ARTHUR LOVERIDGE

WITH FIVE PLATES

CAMBRIDGE, MASS., U. S. A.
PRINTED FOR THE MUSEUM
JANUARY, 1936

No. 3.—*Reports on the Scientific Results of an Expedition to
Rain Forest Regions in Eastern Africa*

III

Mammals

BY GLOVER M. ALLEN AND BARBARA LAWRENCE

WITH FIELD NOTES BY ARTHUR LOVERIDGE

CONTENTS

| | Page |
|-------------------------------------|------|
| Introduction | 31 |
| List of species collected | 34 |
| Systematic discussion | 39 |
| Bibliography | 126 |

INTRODUCTION

The collection dealt with in this report, was made by Mr. Arthur Loveridge while investigating distributional problems associated with rain forest areas in Uganda and Kenya. The enquiry was carried out on behalf of the Museum of Comparative Zoölogy with a fellowship granted by the John Simon Guggenheim Memorial Foundation of New York.

The authors have collaborated in the identification and taxonomic work recorded under the headings of Distribution, Discussion and Coloration. The field notes contributed by the collector, are listed in the first person singular under Measurements, Breeding, Diet, Enemies, Habits, Folklore, Native names, etc.

Altitudes, and other information regarding the localities in which collecting was carried on, will be found in the final paper of this series of reports, which will treat of the whole vertebrate terrestrial fauna of Mounts Debasien and Elgon in relation to that of the Usambara Mountains in Tanganyika Territory.

The period of collecting mammals was from November 9, 1933, to June 30, 1934, during which time 1,024 skins and skulls representing 133 species or races of mammals were secured. Of these 64 forms were new to the collections of the Museum of Comparative Zoölogy. A special feature of the collection was the topotypes, frequently in

series, of 36 species apart from many others which were almost topotypic. It has been found necessary to describe only one bat and a pouched rat as new, namely

Nycteris nana tristis subsp. nov. ♀ from Kaimosi, Kenya Colony.

Saccostomus cricetulus sp. nov. ♂ ♀ from Greeki River, Uganda.

Attention, however, may be directed to such rarities as *Petrodomus s. sangi*, *Nycteris aurita*, *Rhinolophus f. exsul*, *Perodicticus p. ibeanus*, *Cercopithecus neglectus*, *Cercocebus g. galeritus*, *Colobus b. rufomitratu*s, *Zelotomys h. vinaceus*, *Atherurus turneri*, *Dendrohyrax a. bettoni* and many others of which good series were obtained.

When measurements are given serially they are always in the following order: — (1) length from snout to anus; (2) length of the tail without terminal hairs; (3) length of hind foot without claws; (4) length of ear from tip to notch. In the case of bats a fifth measurement is added: (5) length of wing from axilla to tip. All dimensions are in millimetres, and it is those of the *largest* male and *largest* female of the series which are supplied.

We take this opportunity of expressing our thanks to Mr. Gerritt S. Miller Jr., and Dr. Remington Kellogg for loaning material from the National Collection, and Mr. J. K. Doult of the Carnegie Museum; Mons. L. Chopard for identifying the hemimerid parasites and our colleagues, Drs. Joseph Bequaert and J. H. Sandground of the Harvard School of Tropical Medicine for their kindness in identifying the many parasites enumerated in the following pages. All the photographs, where not otherwise stated, were taken by Mrs. Loveridge.

Special interest attaches to those species of mammals characteristic of heavy forest growth in which this collection is particularly rich. Their presence at various localities here marks the eastward or north-eastward limit of their range and is correlated with relict patches of forest, often isolated on mountains or in river valleys. No doubt these areas were formerly more extensive and supported a fauna whose species ranged more or less continuously across the continent though frequently breaking up into local races. Increasing aridity and the effect of human occupation, clearing and burning, has resulted in driving back the eastward outposts of the rain forest with a corresponding restriction in the numbers and ranges of these species.

The following are rather characteristic of this fauna: — *Sylvisorex gemmeus* and *S. mundus*, long-tailed shrews; *Rousettus angolensis*, a

rousette bat here at about its eastern limit; *Nycteris nana tristis*, the dwarf hollow-faced bat, and probably one or two others of the genus although some are more characteristic of slightly drier country; *Perodicticus potto ibeanus*, the eastern potto, for which Kaimosi seems to be about the most eastern station; *Cercocebus g. galeritus*, the crested mangabey, of which an outpost colony on the lower reaches of the Tana River is the sole representative of this genus in Kenya; *Cercopithecus nictitans schmidti*, an eastern representative of the white-nosed monkey, most of the other races of which are West African; *Cercopithecus mitis kibonotensis* and *C. m. stuhlmanni*, well-marked races of the blue monkey, the former found in the coastal forests, the latter in those of the Elgon region and adjacent areas westward; *Colobus polykomos matschiei* of the Elgon region, a close relative of the race of the central Kenya forests; *C. badius rufomitatus*, the red-capped colobus, of special interest since this type is apparently not found in Kenya except for this outpost in the region of the lower Tana River, whilst its nearest ally is probably the race *gordonorum*, a rare animal of south central Tanganyika; *Genetta servalina bettoni*, a close-spotted genet found in the Elgon and Kaimosi forests which is clearly an eastern representative of *G. servalina* of West Africa; *Nandinia binotata arborea*, the tree civet, a very slightly marked form of the type common in the western forests; *Anomalurus jacksoni*, a gray species of scaly-tailed flying squirrel, confined to the heavy forests of Uganda eastward to Kaimosi in Kenya Colony; *Heliosciurus rufobrachium nyansae*, an outpost subspecies of a squirrel common in West African forests and meeting the range of *H. multicolor elegans* an eastern tree squirrel, on Mount Elgon; *H. undulatus shindi*, a related species of which this race is restricted to forested mountain tops in the Taita Hills near the coast; *Protoxerus stangeri bea*, the Kenya giant squirrel, again an eastern race of a forest squirrel common in parts of West Africa but only found in Kenya in the Kakamega forests near Kaimosi; *Claviglis saturatus*, a forest-living dormouse; *Dendromus ruddi*, recalling the unstriped *D. messorius* of the Cameroons; *Oenomys bacchante editus*, the rufous-nosed mouse, evidently allied to West African races of *O. hypoxanthus* and represented on Mount Kenya by a similar subspecies. *Lophuromys sikapusi ansorgei*, the pink-bellied mouse, is apparently here near the eastern limits of its range and giving place to the eastern species *L. a. aquilus*; *Atherurus turneri*, the brush-tailed porcupine, allied to *A. africanus*, perhaps its eastern representative, reaches at Kaimosi, the north-eastern limit of the group's range in Africa; *Hylochoerus meinertzi*

hageni, the forest pig, found in other forested areas of Kenya Colony as well.

To this list doubtless others will be added such as *Colomys*, lately discovered at Elburgon, Kenya, but several genera such as *Stochomys*, *Malacomys*, *Deomys* still only known from West Africa, appear to be absent as are the galagos, *Galago elegantulus* and *G. demidorii*. No doubt these are confined to the western portions of the continent. Additional interest is furnished by those areas in Kenya Colony where the western forest fauna meets with that of the steppe and thornbush districts of the east.

LIST OF SPECIES COLLECTED*

| ERINACEIDAE | Page |
|--|------|
| <i>Atelerix pruneri hindei</i> (Thomas) | 39 |
| MACROSCOLIDIDAE | |
| <i>Petrodromus (Cercotenus) sultan sangi</i> Heller | 39 |
| <i>Nasilio brachyrhynchus delamerei</i> (Thomas) | 40 |
| <i>Elephantulus rufescens rufescens</i> (Peters) | 40 |
| SORICIDAE | |
| <i>Sylvisorex gemmeus</i> Heller | 41 |
| <i>Sylvisorex mundus</i> Osgood | 41 |
| <i>Crocidura nyansae nyansae</i> Neumann | 41 |
| <i>Crocidura hindei</i> Thomas | 42 |
| <i>Crocidura turba zaodon</i> Osgood | 42 |
| <i>Crocidura jacksoni jacksoni</i> Thomas | 43 |
| <i>Crocidura hildegardeae hildegardeae</i> Thomas | 43 |
| <i>Crocidura bicolor elgonius</i> Osgood | 44 |
| PTEROPIDAE | |
| <i>Rousettus (Lissonycteris) angolensis</i> (Bocage) | 44 |
| <i>Rousettus leachi</i> (Smith) | 45 |
| <i>Rousettus lanosus kempfi</i> Thomas | 45 |
| <i>Epomophorus wahlbergi wahlbergi</i> (Sundevall) | 45 |
| <i>Epomophorus labiatus minor</i> Dobson | 46 |
| EMBALLONURIDAE | |
| <i>Taphozous perforatus haedinus</i> Thomas | 46 |

*Species in parenthesis were not collected but are discussed.

| NYCTERIDAE | Page |
|---|------|
| <i>Nycteris nana tristis</i> subsp. nov. | 47 |
| <i>Nycteris hispida</i> (Schreber) | 48 |
| <i>Nycteris aurita</i> (Andersen) | 48 |
| <i>Nycteris damarensis brockmani</i> (Andersen) | 49 |
| <i>Nycteris thebaica revoili</i> Robin | 49 |
| MEGADERMIDAE | |
| <i>Lavia frons rex</i> Miller | 50 |
| <i>Cardioderma cor</i> (Peters) | 50 |
| RHINOLOPHIDAE | |
| <i>Rhinolophus hildebrandtii</i> Peters | 51 |
| <i>Rhinolophus eloquens</i> Andersen | 51 |
| <i>Rhinolophus fumigatus exsul</i> Andersen | 52 |
| HIPPOSIDERIDAE | |
| <i>Hipposideros caffer</i> (Sundevall) | 52 |
| <i>Hipposideros ruber</i> (Noack) | 53 |
| VESPERTILIONIDAE | |
| <i>Pipistrellus nanus</i> (Peters) | 53 |
| <i>Glauconycteris argentata</i> (Dobson) | 53 |
| MOLOSSIDAE | |
| <i>Mops (Allomops) osborni</i> Allen | 54 |
| <i>Chaerephon hindei</i> (Thomas) | 55 |
| CANIDAE | |
| <i>Thos mesomelas mcmillani</i> Heller | 55 |
| (<i>Lycaon pictus lupinus</i> Thomas) | 55 |
| MUSTELIDAE | |
| <i>Mellivora capensis sagulata</i> Hollister | 57 |
| <i>Aonyx capensis hindei</i> (Thomas) | 58 |
| VIVERRIDAE | |
| <i>Civettictis civetta schwarzi</i> Cabrera | 58 |
| <i>Genetta servalina bettoni</i> Thomas | 60 |
| <i>Genetta stuhlmanni stuhlmanni</i> Matschie | 60 |
| <i>Genetta stuhlmanni erlangeri</i> Matschie | 61 |
| <i>Nandinia binotata arborea</i> Heller | 62 |
| <i>Galerella sanguinea ibeae</i> (Wroughton) | 62 |
| <i>Herpestes ichneumon funestus</i> (Osgood) | 63 |

| | Page |
|--|------|
| <i>Atilax paludinosus robustus</i> (Gray) | 63 |
| <i>Ichneumia albicauda ibeana</i> (Thomas) | 64 |
| <i>Helogale undulata rufula</i> Thomas | 65 |
| <i>Mungos mungo colonus</i> (Heller) | 65 |
| FELIDAE | |
| <i>Felis</i> (<i>Leptailurus</i>) <i>capensis hindei</i> Wroughton | 65 |
| <i>Felis ocreata nandae</i> Heller | 66 |
| LORISIDAE | |
| <i>Perodicticus potto ibeanus</i> Thomas | 67 |
| GALAGIDAE | |
| <i>Galago crassicaudatus lasiotis</i> Peters | 68 |
| <i>Galago senegalensis albipes</i> Dollman | 69 |
| <i>Galago senegalensis braccatus</i> Elliot | 69 |
| CERCOPITHECIDAE | |
| <i>Cercopithecus nictitans schmidti</i> Matschie | 69 |
| <i>Cercopithecus aethiops johnstoni</i> Pocock | 71 |
| <i>Cercopithecus aethiops callidus</i> (Hollister) | 71 |
| <i>Cercopithecus mitis kibonotensis</i> Lönnberg | 72 |
| <i>Cercopithecus mitis stuhlmanni</i> Matschie | 73 |
| <i>Cercopithecus neglectus</i> Schlegel | 74 |
| <i>Cercocebus galeritus galeritus</i> Peters | 75 |
| <i>Papio furax</i> Elliot | 75 |
| <i>Papio ibeanus</i> Thomas | 78 |
| PITHECIDAE | |
| <i>Colobus polykomos matschiei</i> Neumann | 78 |
| <i>Colobus badius rufomitratus</i> Peters | 79 |
| ANOMALURIDAE | |
| <i>Anomalurus jacksoni</i> de Winton | 80 |
| SCIURIDAE | |
| <i>Heliosciurus rufobrachium nyansae</i> (Neumann) | 81 |
| <i>Heliosciurus undulatus shindi</i> Heller | 82 |
| <i>Heliosciurus multicolor elegans</i> Thomas | 82 |
| <i>Protoxerus stangeri bea</i> Heller | 83 |
| MYOXIDAE | |
| <i>Claviglis parvus parvus</i> (True) | 83 |
| <i>Claviglis saturatus</i> (Dollman) | 84 |

| CRICETIDAE | Page |
|--|------|
| <i>Dipodillus pusillus</i> (Peters) | 86 |
| <i>Tatera vicina vicina</i> (Peters) | 87 |
| <i>Tatera nigricauda nigricauda</i> (Peters) | 87 |
| <i>Tatera nigrita</i> Wroughton | 87 |
| RHIZOMYIDAE | |
| <i>Tachyoryctes ruddi</i> Thomas | 88 |
| MURIDAE | |
| <i>Dendromus insignis insignis</i> Thomas | 89 |
| <i>Dendromus whytei pallescens</i> Osgood | 89 |
| <i>Dendromus ruddi</i> Wroughton | 89 |
| <i>Dendromus acraeus</i> Wroughton | 90 |
| <i>Zelotomys hildegardae vinaceus</i> Heller | 90 |
| <i>Thamnomys surdaster polionops</i> Osgood | 91 |
| <i>Thamnomys surdaster elgonis</i> Thomas | 91 |
| <i>Oenomys bacchante editus</i> Thomas & Wroughton | 92 |
| <i>Rattus rattus kijabius</i> (Allen) | 93 |
| <i>Aethomys kaiseri medicatus</i> (Wroughton) | 94 |
| <i>Praomys tullbergi jacksoni</i> (de Winton) | 94 |
| <i>Praomys taitae</i> (Heller) | 95 |
| <i>Mastomys coucha tinctus</i> (Hollister) | 95 |
| <i>Mastomys coucha hildebrandtii</i> (Peters) | 96 |
| <i>Leggada triton triton</i> Thomas | 96 |
| <i>Leggada bella bella</i> Thomas | 97 |
| <i>Leggada bella vicina</i> Thomas | 97 |
| <i>Leggada grata grata</i> Thomas | 97 |
| <i>Cricetomys gambianus elgonis</i> Thomas | 98 |
| <i>Lophuromys aquilus aquilus</i> (True) | 99 |
| <i>Lophuromys sikapusi ansorgei</i> de Winton | 100 |
| <i>Saccostomus cricetulus</i> sp. nov. | 100 |
| <i>Acomys ignitus ignitus</i> Dollman | 102 |
| <i>Acomys wilsoni wilsoni</i> Thomas | 103 |
| <i>Dasymys helukus helukus</i> Heller | 103 |
| <i>Pelomys fallax iridescens</i> Heller | 104 |
| <i>Arvicanthis abyssinicus nubilans</i> Wroughton | 104 |
| <i>Arvicanthis abyssinicus virescens</i> Heller | 104 |
| <i>Lemniscomys griselda maculosus</i> (Osgood) | 105 |
| <i>Lemniscomys striatus massaicus</i> (Pagenstecher) | 105 |
| <i>Rhabdomys pumilio diminutus</i> (Thomas) | 105 |
| <i>Otomys tropicalis elgonis</i> Wroughton | 106 |
| <i>Otomys angoniensis classodon</i> Osgood | 106 |

| | |
|--|------|
| HYSTRICIDAE | Page |
| <i>Hystrix galeata</i> Thomas | 107 |
| <i>Atherurus turneri</i> St. Leger | 107 |
| THRYONOMYIDAE | |
| <i>Choeromys gregorianus</i> (Thomas) | 108 |
| LEPORIDAE | |
| <i>Lepus victoriae kakumegae</i> Heller | 109 |
| SUIDAE | |
| (<i>Hylochoerus meinertzhageni meinertzhageni</i> Thomas) | 109 |
| BOVIDAE | |
| <i>Damaliscus korrigum topi</i> Blaine | 110 |
| <i>Cephalophus monticola musculoides</i> Heller | 110 |
| <i>Sylvicapra grimmia deserti</i> Heller | 111 |
| <i>Sylvicapra grimmia lobeliarum</i> Lönnberg | 112 |
| <i>Sylvicapra grimmia nyanzae</i> Neumann | 112 |
| <i>Ourebia montana cottoni</i> Thomas & Wroughton | 113 |
| <i>Raphiceros campestris neumanni</i> (Matschie) | 113 |
| <i>Rhynchotragus kirkii kirkii</i> (Günther) | 113 |
| <i>Rhynchotragus kirkii nyikae</i> Heller | 114 |
| <i>Kobus ellipsiprymnus kuru</i> Heller | 115 |
| <i>Kobus defassa ugandae</i> Neumann | 115 |
| <i>Tragelaphus scriptus delamerei</i> Pocock | 116 |
| <i>Tragelaphus scriptus massaicus</i> Neumann | 117 |
| <i>Tragelaphus scriptus olivaceus</i> Heller | 117 |
| ELEPHANTIDAE | |
| (<i>Loxodonta africana peeli</i> (Lydekker)) | 118 |
| PROCAVIIDAE | |
| <i>Procavia habessinica daemon</i> Thomas | 119 |
| <i>Heterohyrax syriacus kempî</i> (Thomas) | 120 |
| <i>Heterohyrax syriacus hindei</i> (Wroughton) | 121 |
| <i>Dendrohyrax arboreus stuhlmanni</i> (Matschie) | 123 |
| <i>Dendrohyrax arboreus bettoni</i> (Thomas & Wroughton) | 123 |
| DELPHINIDAE | |
| <i>Prodelphinus attenuatus</i> (Gray) | 124 |
| DUGONGIDAE | |
| (<i>Dugong dugon</i> (P. S. L. Müller)) | 125 |

Systematic Discussion

ERINACEIDAE

ATELERIX PRUNERI HINDEI (Thomas)

Erinaceus hindei Thomas, 1910, Ann. Mag. Nat. Hist. (8), 5, p. 193: Kitui, Kenya Colony.

2 ♂ 2 ♀ (M. C. Z. 31796-9) Voi, K. C. 18.iv.34.

Native name. *Kisesegedi* (Kitaita).

Discussion. In 1922, J. A. Allen discussed at length the status of the names *albiventris* and *pruneri*, reaching the conclusion that the former was unidentifiable, and that the latter, synchronously published, should replace it for the typical race from Senaar. This decision rests largely on the fact that no locality can be assigned to the type of *albiventris*, "although the type appears to have been preserved in the Munich Museum." Through the courtesy of the Director of the latter institution, Dr. Lorenz Müller, this specimen has been loaned for examination and proves to be the Senegalese species, which is distinct from *A. pruneri*.

Coloration. This series illustrates what is probably the effect of age, in that the younger two have the spine tips clear white, contrasting with the blackish bases, with a short buffy or pale-ochraceous area forming a transitional band between. In the older specimens many of the whitish tips become discolored buffy, and the black bases of a less intense browner shade. What seem to be new spines with fresh white tips are apparently coming in here and there.

Measurements. ♂. 180. 21. 24. 27 mm., ♀. 165. 18. 22. 24 mm.

Parasites. The largest male was infested with a score or more of large ticks (*Rhipicephalus armatus*). These were not confined to the spinous regions but occurred on the belly where it might have been supposed that an insectivorous animal like a hedgehog would have attacked them.

MACROSCELIDIDAE

PETRODROMUS (CERCOCTENUS) SULTAN SANGI Heller

Petrodromus sultani sangi Heller, 1912, Smithsonian Misc. Coll., 60, No. 12, p. 12: Mount Mbololo, Kenya Colony.

♀ (M. C. Z. 31795) Mt. Mbololo, K. C. 25. iv. 34.

Native name. *Mwonunguomballa* (Kitaita).

Discussion. The specimen is a topotype and apparently the second to be recorded. In color it agrees closely with the typical form, *sultan*, but Hollister, however, believed the race separable on the basis of a narrower rostrum and smaller upper premolars. The latter character is borne out in comparison with a specimen representing typical *sultan*, from Amani, Tanganyika Territory.

Measurements. ♀. 205. 184. 56. 36 mm.

NASILIO BRACHYRHYNCHUS DELAMEREI (Thomas)

Macroscelides delamerei Thomas, 1901, Ann. Mag. Nat. Hist. (7), 8, p. 155: Athi River, Kenya Colony.

♀ (M. C. Z. 31807) Voi, K. C. 7. iv. 34.

Native name. *Mwonungu* (Kitaita).

Discussion. This specimen is immature, having the complete milk dentition only, so that the diagnostic third lower molar of the permanent set is not yet present.

Coloration. The narrow eye ring, interrupted at the front, and not extended behind as a broad white mark to the base of the ear, as well as the richer chestnut of the back seem to confirm its reference to this genus rather than to *Elephantulus*, which was secured at the same locality. It is peculiar in having the backs of the hind feet buffy, instead of clear whitish as in specimens from farther inland.

Measurements. ♀. 97. 80. 27 mm. Ear eaten by ants while the animal was lying dead in a snap-back rat trap.

ELEPHANTULUS RUFESCENS RUFESCENS (Peters)

Macroscelides rufescens Peters, 1878, Monatsb. Akad. Wiss. Berlin, p. 198: Ndi, Taita, Kenya Colony.

1 ♂ 2 ♀ (M. C. Z. 31803-5) Voi, K. C. 9-10. iv. 34.

4 ♀ (M. C. Z. 31800-2, 31806) Mt. Mbololo, K. C. 24. iv. 34.

Distribution. The series from Mount Mbololo, Taita Hills, are practically topotypes.

Native name. *Mwonungu* (Kitaita).

Measurements. ♂. 115. 166. 29. 19 mm., ♀. 138. 125. 31. 20 mm.

SORICIDAE

SYLVISOREX GEMMEUS Heller

Sylvisorex gemmeus Heller, 1910, Smithsonian Misc. Coll., **56**, No. 15, p. 7:
Rhino Camp, Lado Enclave.

1 (M. C. Z. 31242) Kirui, K. C. 6. ii. 34.

3 ♂ 1 ♀ (M. C. Z. 31239-40, 31257, 31259) Kaimosi, K. C. 16-20.
ii. 34.

Native names. *Lunihi* (Luragoli); *luhui* (Lutereki) for all shrews.

Coloration. These five specimens are uniformly dark chocolate brown above, with white-tipped underparts. This color and the long tail, exceeding the head and body, distinguish it readily. Hollister (1918, p. 39) has recorded a large series from Kaimosi and adds a table of measurements.

Measurements. ♂. 75. 87. 14. 7 mm., ♀. 65. 75. 14. 7 mm.

SYLVISOREX MUNDUS Osgood

Sylvisorex mundus Osgood, 1910, Publ. Field Mus. Nat. Hist., Zoöl. Series,
10, p. 18: Kijabe, Kenya Colony.

♂ ♀ (M. C. Z. 31243-4) Butandiga, U. 14. i. 34.

Distribution. In addition to the original locality (Kijabe), specimens are recorded by Hollister (1918, p. 39) from the west side of Mount Kenya at altitudes of from 7,000 to 10,000 feet. This pair from the western slopes of Mount Elgon (7,000 feet) apparently constitute the first record north and west of Mount Kenya.

Native name. *Namageba* (Lugishu).

Discussion. Osgood in his original description indicates its close relationship with *S. granti* of Mount Ruwenzori, in which, however, the tail is relatively longer. In *S. mundus* it is apparently shorter than head and body. The uniformly blackish-brown coloration above and below further distinguishes it at once from the pale-bellied *S. gemmeus*.

Measurements. ♂. 64. 57. 12. 7 mm., ♀. 64. 58. 12. 7 mm.

CROCIDURA NYANSAE NYANSAE Neumann

Crocidura flavescens nyanseae Neumann, 1900, Zoöl. Jahrb. Syst., **13**, p. 544:
Fort Lubwa, Usoga, Uganda.

♀ (M. C. Z. 31266) Sipi, U. 19. xii. 33.

2 ♀ (M. C. Z. 31263-4) Kaimosi, K. C. 20. ii & 9. iii. 34.

Distribution. Hollister (1918, p. 42) has previously recorded this large brown shrew from Kaimosi.

Coloration. One of the specimens from Sipi is just beginning to acquire the new pelage, which appears on the forehead in a patch extending from the nose to between the ears, and again as an oval area in the centre of the back behind the shoulders. The new fur is much darker, more nearly seal brown than the rest, which has faded to a dull brown.

Measurements. ♀. 160. 175. 35. 20 mm.

Parasites. Fleas were removed from the fur of a Kaimosi shrew.

Enemies. One was recovered, and preserved in alcohol, from the stomach of a Nose-horned Viper (*Bitis nasicornis*) at Kaimosi.

CROCIDURA HINDEI Thomas

Crocidura hindei Thomas, 1904, Ann. Mag. Nat. Hist. (7), 14, p. 237: Machakos, Kenya Colony.

♀ (M. C. Z. 31785) Ngatana, K. C. 18. vi. 34.

Native name. *Tungu* (Kipokomo).

Discussion. This shrew is in a short gray pelage, apparently immature. The shorter tail as compared with *C. suahelae* and the flattened skull with a total length of about 24 mm. distinguish it.

Measurements. ♀. 90. 44. 13. 6 mm.

Habitat. I captured this gray shrew beneath a rubbish heap in one of the native gardens.

CROCIDURA TURBA ZAODON Osgood

Crocidura turba zaodon Osgood, 1910, Publ. Field Mus. Nat. Hist., Zoöl. Series, 10, No. 3, p. 21: Nairobi, Kenya Colony.

♀ (M. C. Z. 31268) Greeki River, U. 6. xii. 33.

3 ♀ (M. C. Z. 31254-6) Sipi, U. 20-22. xii. 33.

2 ♂ 4 ♀ (M. C. Z. 31245-50) Butandiga, U. 8-14. i. 34.

2 ♂ 2 ♀ (M. C. Z. 31251-3, 31265) Kaimosi, K. C. 9-26. ii. 34.

Distribution. This seems to be the common shrew in northern Kenya Colony. The series of thirteen skins is largely from Mount Elgon, and so represents *Crocidura turba kempfi* Dollman (type locality, Kirui, Mount Elgon), but this, as Hollister (1918, p. 55) first suggested, is clearly the same as *C. t. zaodon* of the Nairobi region.

Native names. *Etutwi* (Karamojong); *guchuru* (Kisabei); *namageba* (Lugishu); *lunihi* (Luragoli); *luhui* (Lutereki).

Coloration. In color the Greeki River specimen is in a pale reddish-brown pelage, with pale belly, while all of the others are of the usual dark blackish-brown, indicating the occasional occurrence in this as in some other species of the genus, of a reddish color phase.

Measurements. ♂. 87. 60. 14. 7 mm., ♀. 97. 51. 13. 9 mm.

Enemies. Examples of this shrew were removed from the stomachs of Brown House Snakes (*Boaedon lineatus*) at Sipi and Butandiga. Of these the Sipi Shrew was made into a skin.

CROCIDURA JACKSONI JACKSONI Thomas

Crocidura jacksoni Thomas, 1904, Ann. Mag. Nat. Hist. (7), **14**, p. 238:
Ravine Station, Kenya Colony.

♂ (M. C. Z. 31784) Voi, K. C. 12. iv. 34.

3 ♂ 3 ♀ (M. C. Z. 31282-3, 31286-9) Peccatoni, K. C. 25. v. 34.

1 (M. C. Z. 31790) Golbanti, K. C. 23. vi. 34.

Native names. *Nyonge* (Kisagalla); *tungu* (Kipokomo).

Coloration. A fairly uniform series, of a dull chestnut brown and gray, with faintly bicolor tail and pale whitish to grayish underside.

Measurements. ♂. 95. 56. 14. 8 mm., ♀. 85. 60. 12. 12 mm.

Habitat. I dug the Voi specimen out of a mass of flood debris in the dry bed of the Voi River.

CROCIDURA HILDEGARDEAE HILDEGARDEAE Thomas

Crocidura hildegardeae Thomas, 1904, Ann. Mag. Nat. Hist. (7), **14**, p. 240:
Fort Hall, Kenya Colony.

♀ (M. C. Z. 31267) Sipi, U. 22. xii. 33.

♂ ♀ (M. C. Z. 31241, 31258) Kaimosi, K. C. 8 & 15. ii. 34.

♀ ♀ (M. C. Z. 31793-4) Mt. Mbololo, K. C. 23. iv. 34.

♂ (M. C. Z. 31792) Peccatoni, K. C. 25. v. 34.

♂ (M. C. Z. 31791) Wema, K. C. 19. vi. 34.

Distribution. Apparently Heller did not secure this species at Kaimosi so that the pair from that locality and the female from Sipi, Mount Elgon, furnish interesting records north of those given by Hollister (1918, p. 64).

Native names. *Namageba* (Lugishu); *lunihi* (Luragoli); *luhui* (Lutereki); *munyongi* (Kitaita); *tungu* (Kipokomo).

Discussion. The skull length — about 18.5 to 19. mm. — is slightly but constantly less than in *C. jacksoni*. The two females from Mount Mbololo have slightly wider brain cases than the two males from Peccatoni and Wema.

Measurements. ♂. (Wema) 87. 45. 12. 11 mm., ♀. (Kaimosi) 75. 46. 12. 7 mm. The Mbololo females had identical measurements, presumably being subadults from the same nest, ♀ ♀. 67. 47. 12. 7 mm.

Habitat. I dug the Wema shrew from the galleries of a semi-abandoned termitarium.

CROCIDURA BICOLOR ELGONIUS Osgood

Crocidura bicolor elgonius Osgood, 1910, Ann. Mag. Nat. Hist. (8), 5, p. 369: Kirui, Mount Elgon, Kenya Colony.

♀ (M. C. Z. 31262) Butandiga, U. 14. i. 34.

1 (M. C. Z. 31261) Kirui, K. C. 6. ii. 34.

♀ (M. C. Z. 31260) Kaimosi, K. C. 7. iii. 34.

Native names. *Namageba* (Lugishu); *lunihi* (Luragoli); *luhui* (Lutereki).

Coloration. The small shrews of this species are notable for their very short pelage. The Butandiga female is darker than the two others, which have a faintly brownish or chocolate tint instead of being dark seal brown.

Measurements. ♀. (Kaimosi) 58. 43. 8. 7 mm.

PTEROPIDAE

ROUSETTUS (LISSONYCTERIS) ANGOLENSIS (Bocage)

Cynonycteris angolensis Bocage, 1898, Journ. Sci. Math. Acad. Sci. Lisboa (2), 5, p. 133: Pungo Andongo, Cahata, Quibula, Angola.

♀ (M. C. Z. 31149) Sipi, U. 21. xii. 33.

♀ (M. C. Z. 31147) Butandiga, U. 10. i. 34.

Distribution. This bat has been recorded over the area from Angola to the Ruwenzori region and Tanganyika Territory, so that the above records from Mount Elgon extend its known range slightly to the northeast.

Native names. *Bebea* (Kisabei); *ebugut* (Lugishu).

Discussion. The Sipi specimen has a supernumerary lower molar lying to the inner side of the alveolar line, between the usual two molars.

Measurements. ♀ juv. (Butandiga) 112. 0. 18. 19. 230 mm.

ROUSETTUS LEACHI (Smith)

Pteropus leachi A. Smith, 1829, Zoöl. Journ., 4, p. 433: Cape of Good Hope.

3 ♂ 3 ♀ (M. C. Z. 31125, 31128-32) Sipi, U. 18. xii. 33.

Distribution. This is the most northerly point from which typical *leachi* has been reported.

Native names. *Bebea* (Kisabei); *ebugut* (Lugishu).

Discussion. These six specimens are on the whole nearer typical *leachi* than *aegyptiacus*, and agree with the careful description of Andersen in having the palatal ridges 4, 3, 1, instead of 4, 4, 1, all three of those in which the ridges are preserved having three divided ridges behind the molars; the teeth are smaller; and the interorbital constriction equals the postorbital width instead of exceeding it.

Measurements. ♂. 150. 17. 18. 22. 300 mm., ♀. 130. 22. 20. 22. 230 mm.

ROUSETTUS LANOSUS KEMPI Thomas

Rousettus kempi Thomas, 1909, Ann. Mag. Nat. Hist. (8), 4, p. 543: Kirui, Mount Elgon, Kenya Colony.

4 ♂ 1 ♀ (M. C. Z. 31123-4, 31126-7, 31148) Sipi, U. 21. xii. 33.

Native names. *Bebea* (Kisabei); *ebugut* (Lugishu).

Corrigenda. The series of fruit bats from Bagilo, Uluguru Mountains, Tanganyika Territory, previously referred to *leachi* (Allen and Loveridge, 1927, p. 420) are in reality *kempi*, their teeth being only minutely smaller than those of the Sipi series which are practically topotypes of *kempi* coming from the western (Uganda) side of the mountain instead of the southeastern (Kenya) slopes. There seems to be no doubt that the Elgon animal is only a very slightly differentiated race.

Measurements. ♂. 155. 25. 17. 23. 292 mm., ♀. 130. 22. 22. 20. 273 mm.

Parasites. Numerous streblids were collected from the fur of these fruit bats.

Habitat. These bats, as also the Sipi examples of the last two members of the genus, were all collected in the great cave below the magnificent Sipi Falls.

EPOMOPHORUS WAHLBERGI WAHLBERGI (Sundevall)

Pteropus wahlbergi Sundevall, 1846, Öfvers. Kongl. Vet.-Akad. Förh., Stockholm, 3, p. 118: Port Natal, i.e. Durban, Natal.

♂ (M. C. Z. 31122) Sipi, U. 23. xii. 33.

♀ (M. C. Z. 31843) Lamu, Lamu Id., K. C. 7. v. 34.

Distribution. According to Andersen's account, these specimens come from the range covered by the typical race.

Native names. *Ebugut* (Lugishu).

Discussion. Both specimens are young, yet well grown with the epiphyses of the finger joints nearly ankylosed with their respective diaphyses, so that their appearance of small size is deceptive. The skulls prove their youth, having shorter rostra and fuller brain cases than in later stages. The palatal ridges also show a slightly different condition in that the last one is proportionally farther forward than in mature animals, being slightly anterior to the middle of the post-dental palate.

Measurements. ♂. 100. 0. 17. 18. 190 mm., ♀. 91. 0. 15. 18. 200 mm.

EPOMOPHORUS LABIATUS MINOR Dobson

Epomophorus minor Dobson, 1880, Proc. Zool. Soc. London, p. 715: Zanzibar (*fide* Andersen).

♀ (M. C. Z. 31146) Kaimosi, K. C. 25. ii. 34.

Distribution. The type locality of *E. labiatus* is "Abyssinia," so that this specimen from Kaimosi is from a locality nearly midway between the typical areas of that animal and *E. minor*.

Native name. *Linyinya* (Luragoli and Lutereki).

Discussion. Our example seems to be about intermediate in tooth dimensions between *labiatus* and *minor* as shown in Andersen's table but minutely nearer the limits assigned to *minor*, to which it is therefore referred. Since the two forms only differ in size, the occurrence of an intermediate specimen seems to warrant relegating *minor* to subspecific rank.

Measurements. ♀. 116. 0. 17. 18. 222 mm.

Breeding. On February 25, 1934, this female held a large fetus which was preserved.

EMBALLONURIDAE

TAPHOZOUS PERFORATUS HAEDINUS Thomas

Taphozous perforatus haedinus Thomas, 1915, Journ. Bombay Nat. Hist. Soc., 24, p. 62: Chanler Falls, Guaso Nyiro, Kenya Colony.

Taphozous perforatus Hollister, 1918, U. S. Nat. Mus. Bull. 99, p. 73.

5 ♂ 6 ♀ (M. C. Z. 31847, 31849-54, 31874-6, 31878) Lamu Id., K. C. 7. v. 34.

Measurements. ♂. 75. 26. 11. 19. 181 mm., ♀. 80. 26. 12. 18. 187 mm.

Breeding. The female whose measurements are given above was carrying a young male measuring 61. 16. 12. 14. 113 mm.

Habitat. Great numbers of these tomb bats were living in some old buildings along the sea front. The windows had long been boarded up and the places used as warehouses.

NYCTERIDAE

NYCTERIS NANA TRISTIS subsp. nov.

Type. Museum of Comparative Zoölogy, No. 31,156. An adult female, skin and skull, from Kaimosi, Kakamega district, Kenya Colony, collected by Arthur Loveridge, February 13, 1934.

Description. Compared with skins from Lolodorf, Cameroon, representing typical *N. nana* (type locality, Benito River, French Congo), the East African race lacks the warm russet coloration of the fur of both surfaces, and is instead a uniform dark drab gray both above and below. The fur is of the same color from tip to base except on the nape and especially about the bases of the ears, where it is slightly paler, a soiled grayish, basally. On the membranes the fur extends out on the propatagium from the axilla to about the end of the first third of the fore arm, and on the plagiopatagium to a line joining the elbow and the first third of the tibia. On the uropatagium the fur extends out as far as a line connecting the proximal ends of the tibiae. On the under side the extent is about the same, except that it does not quite reach the knees.

Measurements. The specimen has practically the same dimensions as those of the West African race. The type measures: fore arm, 35.8 mm.; tibia, 15.7; foot, 6.5; tail (about) 45; thumb, 11.5; third metacarpal, 28.5; first phalanx, 16.5; fourth metacarpal, 29.7; fifth metacarpal, 30.3 mm.

The skull measures: greatest length, 16.6 mm.; basal length, 12.5; palatal length, 3.6; zygomatic width, 9.3; mastoid width, 8.0; width across frontal plate, 6.6; width outside last molars, 6.2; upper cheek teeth, 5.3; lower cheek teeth, 5.8 mm.

Remarks. Through the kindness of Mr. J. Kenneth Doult, of the Carnegie Museum, we have had the loan of two specimens representing typical *Nycteris nana*, from Lolodorf, Cameroon. Both agree in their pronounced russet tint, contrasting with the dull gray hue of the

eastern animal. It is a rather rare species, for, in addition to the original specimen from Benito River, it has apparently been recorded but twice: by Hollister, in 1918, who mentions two in the United States National Museum from Yala River, Kenya Colony, as forming a considerable extension of the known range into eastern Africa, and again by Cabrera and Ruxton (1926, *Ann. Mag. Nat. Hist.* (9), **17**, p. 591), who had a specimen from Luluabourg, Belgian Congo, that flew into a room. The Cameroon specimens, referred to above, are now recorded for the first time.

NYCTERIS HISPIDA (Schreber)

Vespertilio hispida Schreber, 1774, *Säugethiere*, pl. lvi: Senegal.

2 ♂ 2 ♀ (M. C. Z. 31153-5, 31157) Kaimosi, K. C. 9. ii. & 9. iii. 34.
♀ (M. C. Z. 31842) Ngatana, K. C. 14. vi. 34.

Native names. *Linyinya* (Luragoli); *nundu* (Kipokomo); both general for small bats.

Discussion. Externally these differ from somewhat similar species in having the fur extend laterally on to the membrane from the first third of the forearm to the knee, and on the interfemoral membrane slightly beyond to a line about joining the middle of the tibiae, though more thinly. At the sides of the lateral membrane the fur becomes a golden brown.

Measurements. ♂. (Kaimosi) 50. 48. 7. 22. 140 mm., ♀. (Wema, Ngatana) 48. 50. 7. 20. 124 mm.

Habitat. Both this and the following species occur together for they were brought to my tent late at night by a native who had taken them in the village of Wema close to my camping ground.

NYCTERIS AURITA (Andersen)

Petalia aurita K. Andersen, 1912, *Ann. Mag. Nat. Hist.* (8), **10**, p. 547: Kilifi, Kenya Colony.

♀ (M. C. Z. 32059) Ngatana, K. C. 14. vi. 34.

Distribution. In addition to the type, described by Andersen from Kilifi, which is just a hundred miles south of Ngatana, we have found two other specimens of this bat recorded, namely those in the United States National Museum listed by Hollister (1918, p. 74), one taken many years ago on the Tana River, by Chanler, and recorded by True as *Nycteris hispida*, the other secured by Heller on the Marsabit

Road, northern Kenya Colony. Granvik (1924) it is true reports its occurrence in numbers in a cave on Mount Elgon, but it seems possible that this identification requires confirmation.

Measurements. ♀. 52. 55. 8. 27. 138 mm.

NYCTERIS DAMARENSIS BROCKMANI (Andersen)

Petalia damarensis brockmani K. Andersen, 1912, Ann. Mag. Nat. Hist. (8), 10, p. 548: Upper Sheikh, British Somaliland.

♀ (M. C. Z. 31141) Voi, K. C. 7. iv. 34.

Discussion. This single specimen seems to correspond in every particular to Andersen's description, its measurements being about the maximum of the extremes that he gives. In color the lower side is very pale, almost whitish.

Measurements. ♀. 62. 58. 12. 34. 150 mm.

NYCTERIS THEBAICA REVOILI Robin

Nycteris revoli Robin, 1881, Bull. Soc. Philom. Paris, (7), 5, p. 90: Northern Somaliland.

♀ ♀ (M. C. Z. 31158-9) Elgonyi, K. C. 24. i. & 4. ii. 34.

♀ (M. C. Z. 31160) Kirui, K. C. 29. i. 34.

Native name. *Kubukabuk* (Kitosh).

Discussion. The form *revoli* seems to replace typical *thebaica* in Somaliland and Kenya Colony, and as Dobson once suggested, may prove to be only racially distinct from *capensis* to the south. It seems best, therefore, to regard *revoli* as a subspecies of the Egyptian *thebaica*, which it resembles in size. A cotype of *revoli* which has been used for comparison, does not differ except possibly in minute points that fall within the limits of individual variation.

Measurements. ♀. (Kirui) 50. 52. 10. 33. 144 mm.

Breeding. The female from Kirui on January 29 held a fetus ready for birth (preserved in alcohol). One of the Elgonyi bats was carrying two young on February 4, 1934. The measurements of one of these sucklings were as follows: ♂. 36. 20. 9. 16. 63 mm.

Habitat. The Kirui bat was not taken in Kemp's cave but in a low cavern on the opposite slopes of the valley. When I entered there were five bats in the colony, four flew out immediately on being disturbed so I only succeeded in netting the pregnant female which flew from one corner to another.

MEGADERMIDAE

LAVIA FRONS REX Miller

Lavia rex Miller, 1905, Proc. Biol. Soc. Washington, **18**, p. 227: Taveta, Kenya Colony.

♂ ♀ (M. C. Z. 31134-5) s. bank Greeki River, U. 7. xii. 33.

♂ (M. C. Z. 31133) Kaimosi, K. C. 1. iii. 34.

♂ (M. C. Z. 31836) Kitau, Manda Id., K. C. 15. v. 34.

♂ (M. C. Z. 31839) Mkonumbi, K. C. 29. v. 34.

♀ (M. C. Z. 31837) Golbanti, K. C. 22. vi. 34.

Native name. *Lumenwa* (Karamojong).

Discussion. The status of the forms described as *rex* and *affinis* seems still not to be finally settled, but we have provisionally considered these specimens to represent the former.

Measurements. ♂. (Kaimosi) 70. 0. 16. 42. 190 mm., ♀. (Greeki River) 71. 0. 18. 45. 162 mm.

Enemies. The skin from Kitau was taken from a freshly swallowed bat recovered from the stomach of a Common Mamba (*Dendraspis angusticeps*).

Habitat. The pair from Greeki River were shot as they hung together in a thorn tree near the south bank. The species was also seen at Shella on Lamu Island. They were common in the acacia on Manda Island. The Mkonumbi bat was flitting from tree to tree calling with a bird-like note just after dark. After watching it for some time, I shone its eyes with an electric torch and shot it with a .22 cartridge loaded with dust shot.

CARDIODERMA COR (Peters)

Megaderma cor Peters, 1872, Monatsb. Akad. Wiss. Berlin, p. 194: Abyssinia.

4 ♂ 8 ♀ (M. C. Z. 31825-35, 31838) Lamu Id., K. C. 8. v. 34.

Distribution. This seems to be a rather uncommon species principally found in northeastern Africa.

Coloration. The uniformly blue-gray pelage is a shade darker in the immature specimen.

Measurements. ♂. 75. 0. 18. 35. 175 mm., ♀. 75. 0. 18. 39. 174 mm.

Parasites. Streblids were recovered from their fur.

Habitat. At least a hundred of these bats were found to be occupying a deserted house on one of Mr. C. E. Whitton's estates about half-an-hour's walk northwest of Lamu township. They hung from

the beams and found ready egress through the large gaps in the rotting thatch. All were shot with a .22 rifle whose rifling was removed to fire dust shot.

RHINOLOPHIDAE

RHINOLOPHUS HILDEBRANDTII Peters

Rhinolophus hildebrandtii Peters, 1878, Monatsb. Akad. Wiss. Berlin, p. 195: Ndi, Taita, Kenya Colony.

♀ (M. C. Z. 31840) Voi, K. C. 11. iv. 34.

Distribution. Voi is only about fifteen miles distant from the type locality.

Coloration. This specimen agrees in its pale buffy color with examples from Tanganyika Territory, in this respect differing noticeably from the series of the smaller, darker *R. eloquens*.

Measurements. ♀. 80. 45. 12. 33. 195 mm.

RHINOLOPHUS ELOQUENS Andersen

Rhinolophus hildebrandtii eloquens K. Andersen, 1905, Ann. Mag. Nat. Hist. (7), 15, p. 74: Entebbe, Uganda.

♂ (M. C. Z. 31173) Mt. Debasien, U. 13. xi. 33.

1 + 7 ♂ 2 ♀ (M. C. Z. 31161-70) Kirui, K. C. 23. i. 34.

♀ (M. C. Z. 31171) Elgoni, K. C. 23. 1. 34.

Native names. *Lumenwa* (Karamojong); *kurukuru* (Kitosh).

Discussion. Hollister (1918, p. 84) has shown that this smaller species is well separated in dimensions, with a forearm of about 56 or 57 mm., from the larger *R. hildebrandtii* and probably should be considered as a distinct species, rather than a geographical race.

Coloration. This fine series of well made skins shows a decided difference in color from the series of *hildebrandtii* from Tanganyika collected by Loveridge on an earlier expedition. They are decidedly darker, a general light blackish brown, instead of buffy brown (cf. Ridgway) and can easily be separated by this character, thus confirming Hollister's judgment of their specific distinction.

Measurements. ♂. (Kirui) 75. 30. 13. 29. 177 mm., ♀. (Kirui) 73. 30. 12. 28. 181 mm.

Parasites. One had an hemipterous polycetenid as well as a large tick (*Ixodes simplex*) on its breast, many had encysted flies (*Ascodipteron*) in their wings as well as numerous streblids.

Habitat. All the Kirui series were taken in Robin Kemp's cave in the course of an hour. They simply swarmed in the low recesses at the back of this cave, the noise of their wings was like the running of the engine of a stationary car. When molested in one of these subsidiary caves they quickly migrated to another. We followed by crawling through the tunnel back into the main cave and thence to their fresh refuge. Associated with them, though in the proportion of one to ten, were some horseshoe bats (*Hipposideros caffer*) or perhaps the latter were more adroit at avoiding the butterfly net employed in capturing their companions.

I shot the Debasien bat at dusk as it hung up in a thorn tree to rest.

RHINOLOPHUS FUMIGATUS EXSUL Andersen

Rhinolophus fumigatus exsul K. Andersen, 1905, Ann. Mag. Nat. Hist. (7), 15, p. 74: Kitui, Kenya Colony.

Yng. (M. C. Z. 31172) Kirui, K. C. 5. ii. 34.

Discussion. This seems to be an uncommon species. Only one example, and that without skull, was available to its describer in 1905. It was one of the few species of the genus which the East African expeditions of the United States National Museum failed to find in that region. In addition to the male secured by Loveridge, the Museum of Comparative Zoölogy has a second from the Kenya forest, ten miles west of Chuka, collected by Dr. F. R. Wulsin in 1914. The skull shows the minute upper and lower premolars present. The hairy noseleaf and the forearm of about 51–52 mm. are distinctive in comparison with other East African members of the genus.

HIPPOSIDERIDAE

HIPPOSIDEROS CAFFER (Sundevall)

Rhinolophus caffer Sundevall, 1846, Öfvers. Kongl. Vet.-Akad. Förh., Stockholm, 3, p. 118: Near Port Natal, Natal.

7 ♂ (M. C. Z. 31844–6, 32062–5) Tsavo, K. C. 30. iii. 34.

Measurements. ♂. 52. 32. 8. 15. 136 mm.

Habitat. I captured all these at night with a butterfly net in one of the rooms of the abandoned house, three hundred yards north of the station, which I occupied. By day the bats apparently sleep in the roof, but at night fly in and out of the rooms through the broken window panes, and rest by hanging on the cornices.

HIPPOSIDEROS RUBER (Noack)

Phyllorhina rubra Noack, 1893, Zoöl. Jahrb. Syst., 7, p. 586: "Lügerrunjere"
i.e. Ngerengere River, Tanganyika Territory.

♀ (M. C. Z. 31150) Kirui, K. C. 23. i. 34.

♂ ♀ (M. C. Z. 31151-2) Elgoni, K. C. 23. i. 34.

Coloration. These three skins represent the brown phase.

Measurements. ♂. 61. 35. 8. 15. 147 mm., ♀. (Elgoni) 55. 38. 8. 15. 147 mm.

Parasites. A nycteribiid on one.

VESPERTILIONIDAE

PIPISTRELLUS NANUS (Peters)

Vespertilio nanus Peters, 1852, Reise nach Mossambique, Säugethiere, p. 63:
Inhambane, Mozambique.

7 ♂ 3 ♀ (M. C. Z. 31136-45) Kaimosi, K. C. 26-28. ii. 34.

2 ♂ 6 ♀ (M. C. Z. 31868-73, 32060-1) Mt. Mbololo, K. C. 23. iv. 34.

♂ (M. C. Z. 31867) Golbanti, K. C. 22. vi. 34.

Native name. *Eososi* (Kitaita).

Coloration. The series from Kaimosi averages slightly darker than the other specimens listed above which are from the coastal region. They can, however, be matched by specimens from Tanganyika Territory to the south, so that the difference is probably due to fading.

Measurements. ♂. (Kaimosi) 43. 34. 5. 8. 100 mm., ♀. (Kaimosi) 38. 30. 5. 8. 107 mm.

Breeding. One of the females from Kaimosi was carrying a young one at her breast on February 26, 1934.

GLAUCONYCTERIS ARGENTATA (Dobson)

Chalinolobus (Glauconycteris) argentatus Dobson, 1875, Proc. Zoöl. Soc. London, p. 385: Cameroon Mountains.

7 ♂ 8 ♀ (M. C. Z. 31879, 31881-7, 32052-8) Kikuyu, K. C. 14. iii. 34.

Measurements. ♂. 55. 46. 4. 9. 140 mm.

Breeding. Four of the females were carrying young.

Habitat. Dr. J. W. Arthur directed my attention to a circular patch on his lawn where the grass had been killed. It was about a foot in diameter and immediately beneath a solid cluster of these

bats, which were hanging in a correspondingly circular area of an ornamental 'palm' (*Dracaena* sp.) at a height of twelve feet from the ground.

After they had been photographed, during which process they showed no nervousness though the camera and operator were within six feet of them, I made one sweep of my net which resulted in the capture of thirty bats. Five were released one by one and photographed in flight, unfortunately the results were not a success. Ten were skinned and donated to the Coryndon Museum at Nairobi in appreciation of the facilities and materials afforded for skinning. I reached Nairobi at 11 A.M. and my young Mgishu skinner started on the work almost immediately continuing until he had finished the last of the twenty-five at 5 P.M.

MOLOSSIDAE

MOPS (ALLOMOPS) OSBORNI Allen

Mops (Allomops) osborni J. A. Allen, 1917, Bull. Amer. Mus. Nat. Hist., **37**, p. 473: Kinshasa, near Leopoldville, Belgian Congo.

♀ (M. C. Z. 31863) Bellazoni, K. C. 5. vi. 34.

5 ♂ 5 ♀ (M. C. Z. 31855-62, 31864-5) Ngatana, K. C. 14. vi. 34.
also 5 in alcohol with the same data as these last.

Native name. *Nundu* (Kipokomo).

Coloration. On comparing these skins with a considerable series from Ujiji, collected by Loveridge on a previous expedition, they seem to average paler on the throat and chest. In the Ujiji series, which must represent the typical race, the throat is gray in most cases, and this color extends to the upper chest. In two or three, however, the whole central part of the under surface is white from the dark chin to the anus.

In the Ngatana series only two out of the ten are dark throated, the others being pure white throughout the mid-ventral region. Notwithstanding this apparently average difference, the extremes are bridged by individual variation, so that it does not seem possible to recognize a coastal race. A few of the series have the entire dorsal surface of head and body mixed with whitish hairs, giving a slightly frosted effect, while others are uniformly brown above.

Measurements. ♂. 85. 52. 12. 19. 180 mm., ♀. 77. 49. 11. 17. 170 mm.

Habitat. These were obtained from the school house of a village, on the banks of the Tana, which had been abandoned by order of the medical officer of health.

CHAEREPHON HINDEI (Thomas)

Nyctinomus hindei Thomas, 1904, Ann. Mag. Nat. Hist. (7), **13**, p. 210: Fort Hall, Kenya Colony.

♂ ♂ (M. C. Z. 31866, 31877) Witu, K. C. 7. vi. 34.

Coloration. Although both these specimens agree in the pattern of white markings, with the midventral area and a line from armpit to anus white, wings white, interfemoral dark, the older specimen is much more russet brown than the younger, which is a grayish chocolate.

Measurements. ♂. 60. 41. 9. 17. 138 mm.

CANIDAE

THOS MESOMELAS MCMILLANI Heller

Thos mesomelas mcmillani Heller, 1914, Smithsonian Misc. Coll., **63**, No. 7, p. 6: Mtito Andei Station, Kenya Colony.

♂ ♂ (M. C. Z. 31957, 31960) Tsavo, K. C. 3. iv. 34.

Coloration. These two jackals, from very near the type locality, agree with the coastal race in the pale sides, buff instead of rufous, and generally less rufous tints than the more inland race.

Native name. Muzozo (Kitaita).

Measurements. ♂. 745. 330. 162. 106 mm.

Dict. In the stomachs of both were numerous scraps of goat hide and hair, obviously trimmings picked up at the village; in addition there was much wild fruit.

Habits. Both were shot as they visited the carcass of a hyrax which I had pegged beneath a baobab, the first at 1.45 A.M., the second at 2.30 A.M. Their calls, which seemed to me to differ considerably from those of jackals in central Tanganyika, could be heard in each case for half-an-hour before the animal arrived.

LYCAON PICTUS LUPINUS Thomas

Lycaon pictus lupinus Thomas, 1902, Ann. Mag. Nat. Hist. (7), **9**, p. 439: Nyuki River Swamp, Rift Valley, Kenya Colony.

Native name. *Kiwao* (Kitaita).

Habits, etc. On arrival at Kibwezi, March 22, 1934, I made enquiries with a view to securing topotypes of the hunting dog (*L. huebneri*) described from here. Herr. Huebner, I learned, had been employed on the Dwa Estate many years before the War. I walked out to Dwa, which is four miles from Kibwezi station, and was told by Mr. A. B. C. Smith, the manager of Dwa Estate, that one of his staff, Mr. Cushny, had, only a fortnight before, shot and killed ten and wounded an eleventh hunting dog from a pack of twelve. The place was fifteen miles away and Mr. Smith very kindly arranged for a native to be sent to the spot. On his return, this man reported that no skulls were to be found, and presumed that hyenas had cleaned up the spot. At irregular intervals packs hunt through the Estate, usually at night. It would be very difficult to arrange to hunt such mobile creatures which are here one day and miles away the next.

At Tsavo, on April 4, 1934, I was awakened at daybreak, half-an-hour before sunrise, by the patter of feet outside the long-vacant house which I was occupying. Almost simultaneously a hoof sharply struck a tin can. Springing from bed, I stepped out on to the verandah. For a hundred feet around the house the ground is clear, beyond this the thornbush stretches like a blanket over the country, in every direction, so far as the eye can see. At the edge of the clearing stood a half-grown waterbuck calf; next moment it had disappeared into the bush.

Returning to my room, I began to dress and was putting on my puttees when my ears were assailed by the terrified bleating of the young waterbuck. The cries came from the front of the house, down by the river. Snatching up a rifle, I raced down the slope, dodging the thornbushes as best I could. Ahead of me sounded a heavy splash followed by much splashing. Some animal dashed through the grass at the river's brink, it was a hunting dog. I took a snapshot at it but missed being very much out of breath. Up to this time I had not given hunting dogs a thought having supposed that a crocodile had seized the calf or its mother. Later my gunbearer reported that he had seen the mother make off to the south as I ran down the hill.

The calf was standing in the middle of the Tsavo River, only its head and part of its back showed above the swift current. Some hunting dogs were in shallow water on the farther side but lost no time in scrambling out and up the bank. On my side two others, hidden in the rank grass, barked and yapped defiantly at me before taking to the thornbush. I followed them for a quarter-of-an-hour

but they kept well to cover. Returning to the river we found the buck still in the same place, we sat down to watch it, momentarily fearing that it would be taken by a crocodile. After waiting ten minutes, however, we saw the creature swim upstream then struggle up the farther bank. The dogs had been hunting silently until now, but later in the morning we heard them calling, and concluded that they made a kill about a mile down the river about 11 A.M.

According to the natives, hunting dogs visit Manda Island from time to time, harassing the dikdik, then return to the mainland.

MUSTELIDAE

MELLIVORA CAPENSIS SAGULATA Hollister

Mellivora sagulata Hollister, 1910, Smithsonian Misc. Coll., **56**, No. 13, p. 2: Mount Kilimanjaro, Tanganyika Territory.

Native skin (M. C. Z. 31951) Mt. Mbololo, K. C. 14. iv. 34.

Native names. *Ekore* (Karamojong); *kisegi* (Kitaita).

Coloration. This skin agrees fairly well with Hollister's description and with other specimens from Tanganyika Territory. The buffy stripe continues from the forehead to the rump, while the remaining pale area of the back is darker with admixture of black hairs and others with rusty tips, perhaps in part due to staining. Where these animals live in red-soil country they become much stained with this earth.

Folklore. The following tale was related by my Karamojong gun-bearer. "Once upon a time a Karamojong woman was out in the bush when she came upon a ratel which had been covered with dirt by termites. Its ears and tail were showing, however. Exclaiming 'What good fortune to find an animal already dead,' she took some branches and brushed off the dirt. It was a time of scarcity or famine so she concealed the ratel among her skin clothing and returned home. On her meeting some neighbors, they asked her, 'What have you there?' To deceive them, she replied, 'Oh, nothing, a dead creature which has become very rotten.' When they would have seen it, she refused and, entering her hut, fastened the door securely.

This being done she instructed her child to build up the fire. Then told him to bring a knife with which to skin the ratel. The boy tried to cut the tough skin but failed. His mother ordered him to sharpen the knife. Then she held the ratel while he tried to cut into the skin

at the throat. At this the ratel moved an ear. The boy cried, 'Mother, it is not dead.' 'Nonsense,' answered the mother. 'Do as I bid you.' The child then succeeded in making an incision whereupon the ratel, which had only been somnolent as a result of gorging itself upon honey and grubs, revived and attacked the child. The mother attempted to drive it off but the savage creature sprang upon her, scratching her head and face and biting her severely.

She shrieked aloud for help, the neighbors tried the door but found it fastened too securely for them to open. The woman's husband, who had been herding goats, was returning to the village when he heard the uproar. Leaving the goats in care of another son, he hurried to the house and broke down the door. As he did so, the ratel dashed out, the assembled neighbors hurled their spears at it, but not a spear penetrated the tough hide and the ratel made good its escape."

Compare this story with that of the Wakami relating to a civet as recorded under that species.

AONYX CAPENSIS HINDEI (Thomas)

Lutra capensis hindei Thomas, 1905, Ann. Mag. Nat. Hist. (7), 15, p. 78: Fort Hall, Kenya Colony.

♂ ♀ (M. C. Z. 31621-2) Mwahedio River, Kaimosi, K. C. 9. ii. 34.

Native names. *Lizibi* (Luragoli); *inzibi* (Lutereki).

Discussion. Two beautiful specimens of the clawless otter are referred to *hindei*, although they differ from the type as described by Thomas, in having the ears rimmed with white above as is usual in the species, instead of uniformly dark. As noted by J. A. Allen both this and the race *helios* from the Sotik were based on single individuals, so that until series of specimens can be compared, the value of the characters claimed for them cannot be estimated.

Measurements. ♂. 740. 425. 120. 33 mm., ♀. 600. 400. 130. 30 mm.

Parasites. Ticks (*Haemaphysalis leachii*) were abundant in their fur.

VIVERRIDAE

CIVETTICTIS CIVETTA SCHWARZI Cabrera

Viverra civetta orientalis Matschie, (not *V. orientalis* Hodgson, 1842 = *V. zibetha* Linnaeus) 1891, Arch. für Naturgesch., 1, p. 352: Zanzibar.

Viverra civetta schwarzi Cabrera, 1929, Mem. R. Soc. Español. Hist. Nat., Madrid, 16. No. 1, p. 36, footnote: Bagamoyo, Tanganyika Territory.

Viverra civetta matschiei Pocock, 1933, Journ. Bombay Nat. Hist. Soc., 36, p. 429, footnote.

♂ (M. C. Z. 31612) Sipi, U. 18. xii. 33.

♀ ♀ (M. C. Z. 31104, 32271) Butandiga, U. 9. i. 34.

♀ (M. C. Z. 31611) Bukori, K. C. 18. i. 34.

♂ ♀ (M. C. Z. 32203, 32257) Kaimosi, K. C. 15 & 23. ii. 34.

Native names. *Mugis* (Kisabei); *ndesi* (Lugishu); *kuteli* (Kitosh); *nderect* (Kimasai); *ligunyuli* (Luragoli); *likunyuli* (Lutereki); *fungo* (Kitaita).

Coloration. The Sipi male is melanistic.

Measurements. ♂. (Kaimosi) 930. 400. 140. 55 mm., ♀. (Butandiga) 890. 410. 125. 52 mm.

Breeding. The big Butandiga female was suckling a large kitten, the latter measuring: ♀. 420. 180. 75. 41 mm. The Kaimosi female was also obviously nursing a family on February 15, 1934.

Diet. The Sipi civet was very emaciated and its stomach held only a mass of hair matted into the shape and size of an ordinary brown rat. One Kaimosi animal held a rat (*Oenomys b. editus*), the other a nosehorned viper (*Bitis nasicornis*) and some invertebrates.

Parasites. Ticks (*Haemaphysalis leachi*) were collected from the Sipi, Butandiga and Kaimosi civets.

Folklore. "Civets," said an Mkami to me, "rob our gardens of the maize, gorge upon the cobs, and then retire to the bush to sleep. They sleep so heavily with their mouths wide open that they deceive even the flies who, supposing them to be dead, assemble to lay their eggs about the gaping jaws. One day an Mkami discovered that his garden had been robbed, tracked the thief and found that it was a civet which had apparently succumbed from too heavy a repast. Wrapping the animal in banana leaves, he threw it over his shoulder and returned to the village where a beer-drink was in progress. As the Wakami ate civets in those days, and he was anxious to avoid sharing the meat with his neighbors, he entered his hut surreptitiously, closed the door, and built up a big fire.

"His wife and children gathered round as he thrust the *fungo* on the fire to roast. Immediately the creature awoke and dashing wildly about the hut broke utensils and scattered the fire. Seizing a spear the man attempted to kill the terrified animal, but in the uproar, smoke, and confusion accidentally speared his own child. On realizing what had happened, the mother and other children began to wail. The neighbors, hearing the outcry, broke in the door and dragged the

man away to a council of the old men who fined him heavily in goats for the murder."

"So that is what came of his not sharing his find with his friends," added Salimu, with a grin. "He lost the civet, killed his child, and it cost him several goats. The only profit was for the village elders who had a good feast at his expense."

Whether this moral tale was pure folklore, or whether it had some slight basis in fact, of course, I cannot say. It was related to me as an explanation of why the Wakami will not touch civet meat today. Strangely enough, my superior, and relatively cultured, Mganda cook had a great fondness for civet, toasting the meat over the fire. As his companions scorned to touch it, the carcasses of all the animals listed above fell to his share. In comparing the foregoing story with the Karamojong tale of a ratel, it should be remembered that the Wakami and Karamoja tribes are separated by seven hundred miles.

GENETTA SERVALINA BETTONI Thomas

Genetta bettoni Thomas, 1902, Ann. Mag. Nat. Hist. (7), 9, p. 365: Lagari, Mau district, Kenya Colony.

♂ (M. C. Z. 32305) Sipi, U. 26. xii. 33.

♀ (M. C. Z. 32207) Butandiga, U. 12. i. 34.

♀ (M. C. Z. 32306) Kaimosi, K. C. 10. ii. 34.

Native names. *Lungiri* (Lugishu); *kidarongo* (Luragoli); *shingangayu* (Lutereki).

Discussion. This small-spotted genet is evidently an eastern representative of the *servalina* type of West African forests, and we have therefore regarded it as a subspecies of that animal. It furnishes another instance of the eastward extension of the forest fauna of the Congo basin, and is apparently a much less common species than *G. s. stuhlmanni* in the area here covered. Hollister (1918, p. 118) records two examples from the Kakamega region in the United States National Museum.

Measurements. ♂. 505. 445. 81. 41 mm., ♀. 412. 350. 77. 42 mm.

Breeding. The Butandiga genet is only a little more than halfgrown.

Diet. Rodent fur in the stomach of the Sipi specimen.

Parasites. Ticks (*Haemaphysalis leachii*) were present on the Butandiga example.

GENETTA STUHLMANNI STUHLMANNI Matschie

Genetta stuhlmanni Matschie, 1902, Verh. V. Int. Zoöl-Congr., Berlin, p. 1142: Bukoba, Tanganyika Territory.

- 3 ♂ 1 ♀ (M. C. Z. 32289-92) Sipi, U. 19-25. xii. 33.
 ♂ (M. C. Z. 32296) Butandiga, U. 9. i. 34.
 ♀ (M. C. Z. 32297) Kirui, K. C. 31. i. 34.
 1 ♂ 10 ♀ (M. C. Z. 32293-5, 32298-303, 32308-9) Kaimosi, K. C.
 9. i-17. ii. 34.

Native names. *Mwown* (Kisabei); *lunziri* (Lugishu); *kumondo* (Kitosh); *maragok* (Kimasai); *kidarongo* (Luragoli); *shitarongo* (Lutereki).

Coloration. Notwithstanding the great individual variation in color, this seems to be of a fairly definite sort. In skins from the same locality, the ground color is usually buffy, sometimes light gray without buffy tinge except that the pale rings of the tail are almost always somewhat tinged with buffy. The spots and broken stripes of darker, are either all black, or there is a variable amount of chestnut or rusty red hairs in the center of the black spot, these hairs predominating in some and in the extreme cases forming the entire spot to the practical exclusion of black hairs.

Measurements. ♂. (Kaimosi) 520. 420. 75. 44 mm., ♀. (Kaimosi) 500. 430. 85. 44 mm.

Breeding. This largest female from Kaimosi, killed on February 16, 1934, had two kittens, both of which were females, the bigger measuring 270. 222. 60. 35 mm.

Diet. The stomach contents of Sipi genets were noted as follows: (1) rodent fur; (2) rodent remains, apparently those of several young rats together with the reddish feathers of a bird, or birds, possibly those of nestling Paradise Flycatchers (*Tchitrea v. viridis*); (3) a young rat (*Otomys t. elgonis*) and a round white forest fruit smaller than an average marble. The Butandiga genet held a rat (*Tatera* sp.) while Kaimosi specimens contained: (1) rodent fur; (2) a tree rat (*Oenomys b. editus*); (3) a swamp rat (*Otomys t. elgonis*).

Parasites. Ticks (*Haemaphysalis leachii*) on a Sipi and Kaimosi genet, the Sipi animal also harboring a tapeworm (*Taenia parva*).

GENETTA STUHLMANNI ERLANGERI Matschie

Genetta erlangeri Matschie, 1902, Verh. V. Int. Zoöl.-Congr., Berlin, p. 1143:
 Kitui, Kenya Colony.

- ♀ (M. C. Z. 32326) Mt. Mbololo, K. C. 25. iv. 34.
 ♀ (M. C. Z. 32304) Lamu Island, K. C. 12. v. 34.
 ♀ (M. C. Z. 32325) Ngatana, K. C. 12. vi. 34.

Native names. *Ludindi* (Kitaita); *kanu* (Kiswahili and Kipokomo).

Coloration. These are referred to the paler coastal race, although it must be admitted that many specimens are difficult to place. The adult from Lamu Island has a pale gray ground color with black spots and, except for the white instead of buffy rings on the tail, it is practically an exact match for the palest of the Kaimosi series of the typical form. The whitish rings on the tail characterize the two other specimens which are immature, whereas in all the Kaimosi series the rings are buffy. The same variation in the spots from black to red-centered or all-chestnut-red is seen in the coast form.

Measurements. ♀. 500. 420. 87. 44 mm.

NANDINIA BINOTATA ARBOREA Heller

Nandinia binotata arborea Heller, 1913, Smithsonian Misc. Coll., **61**, No. 13, p. 9: Lukosa River, Kenya Colony.

2 ♀ (M. C. Z. 32249-50) Sipi, U. 18 & 22. xii. 33.

♀ (M. C. Z. 32248) Butandiga, U. 13. i. 34.

4 ♂ 1 ♀ (M. C. Z. 31101, 31623-4, 32193, 32251) Kaimosi, K. C. 14-24. ii. 34.

Type locality. The Kaimosi series are topotypes as they come from the forest through which the Lukosa (i.e. Yala) River flows.

Native names. *Mowc* (Kisabei); *liwala* (Lugishu); *minamugogo* (Luragoli); *kunamugogo* (Lutereki).

Coloration. This series is very uniform in its ground tint as well as in the rather light spotting, but is not very different in these characters from Cameroon examples of the typical form, though in the latter the general tone is slightly darker.

Measurements. ♂. 580. 560. 80. 41 mm., ♀. (Kaimosi) 530. 530. 80. 38 mm.

Dict. One stomach held a tree rat (*Oenomys b. editus*), another a swamp rat (*Otomys t. elgonis*) at Kaimosi, all the other stomachs were empty and free of parasites.

Enemies. The bodies were eaten by the Bagishu who hunted them.

GALERELLA SANGUINEA IBEAE (Wroughton)

Mungos sanguineus ibeae Wroughton, 1907, Ann. Mag. Nat. Hist. (7), **20**, p. 118: Fort Hall, Kenya Colony.

♀ (M. C. Z. 32332) Tsavo, K. C. 2. iv. 34.

Discussion. The late Dr. J. A. Allen has advocated the use of the generic name *Galerella* for the mongooses of this group. Thomas's *Myonax* is perhaps not very different.

Measurements. ♀. 295. 280. 55. 25 mm.

Diet. The stomach was empty, these animals being diurnal feeders.

Habitat. At 8 A.M. I observed a pair of mongoose basking in company of a hyrax (*H. s. hindei*) on the top of a huge rock, the hyrax observed me and promptly disappeared. I stalked its companions, the male mongoose rose on its hind legs, meerkat fashion, the better to see me, then followed the hyrax as I fired at the female.

HERPESTES ICHNEUMON FUNESTUS (Osgood)

Mungos ichneumon funestus Osgood, 1910, Publ. Field Mus. Nat. Hist., Zoöl. Series, 10, No. 3, p. 17: Naivasha, Kenya Colony.

♂ (M. C. Z. 32245) Sipi, U. 11. xii. 33.

♂ (M. C. Z. 32246) Kirui, K. C. 30. i. 34.

2 ♂ 4 ♀ (M. C. Z. 32240-4, 32247) Kaimosi, K. C. 17-26. ii. 34.

Native names. *Ekosemate* (Karamojong); *churunguru* (Kisabei); *serengeta* (Lugishu); *anamambi* (Kitosh); *mogoect* (Kimasai); *lunamageki* (Luragoli); *linueli* (Lutereki).

Discussion. In spite of its large size, the dentition of this mongoose is noticeably weak in comparison with that of *Atilax*.

Measurements. ♂. (Kirui) 600. 460. 91. 35 mm., ♀. (Kaimosi) 540. 480. 82. 35 mm.

Breeding. A kitten (♂. 275. 150. 53. 26 mm.) obtained at Kaimosi on February 20, 1934, had milk only in its stomach.

Diet. At Sipi, rodent fur and the claw of a fowl. At Kaimosi, three animals each held a different species of rat, viz. *Oenomys b. editus*, *Pracomys t. jacksoni* and *Arvicanthis a. nubilans*.

Parasites. Nematodes (*Ascaris* sp.) were collected from one Kaimosi mongoose.

ATILAX PALUDINOSUS ROBUSTUS (Gray)

Athylax robustus Gray, 1864, Proc. Zoöl. Soc. London, p. 558: White Nile.

♂ (M. C. Z. 32256) Butandiga, U. 9. i. 34.

♂ (M. C. Z. 31606) Kaimosi, K. C. 12. ii. 34.

Native names. *Linsi* (Lugishu); *mugocet* (Kimasai); *lunamatu* (Luragoli).

Coloration. While both specimens agree closely in body color, the one from Butandiga has a much more uniformly black tail than the other, in which the color of the tail is about that of the body.

Measurements. ♂. (Kaimosi) 620. 360. 117. 39 mm.

Diet. The stomachs of both held the remains of small rodents.

Parasites. Ticks (*Haemaphysalis leachii*) were collected on the Butandiga mongoose.

ICHNEUMIA ALBICAUDA IBEANA (Thomas)

Herpestes albicaudus ibeanus Thomas, 1904, Ann. Mag. Nat. Hist. (7), **13**, p. 409: Stony Athi, Kenya Colony.

♀ (M. C. Z. 32255) Kirui, K. C. 31. i. 34.

1 ♂ 4 ♀ (M. C. Z. 31601, 32252-4, 32258) Kaimosi, K. C. 12. ii-2. iii. 34.

♀ (M. C. Z. 31958) Kibwezi, K. C. 28. iii. 34.

♂ (M. C. Z. 31959) Tsavo, K. C. 3. iv. 34.

Distribution. This race occurs on Mount Mbololo where a freshly taken pelt was seen.

Native names. *Waranyet* (Kimasai); *usambaruo* (Lugishu); *kinueli* (Luragoli); *linueli* (Lutereki); *mwalasangali* (Kitaita).

Coloration. Heller (1913, Smithsonian Misc. Coll., **61**, No. 13, p. 11) distinguished the white-tailed mongoose of the coastal area as *ferox* with Changamwe, near Mombasa, as type locality. Hollister (1918, p. 130) is inclined to doubt its validity and places it in the synonymy. The two specimens from Kibwezi and Tsavo listed above, are, however, distinctly lighter than those from Kaimosi and Kirui, with less of the long black tips to the hairs of the dorsal region, so that possibly it may be recognizable when series are compared. Melanism is common in the entire area, making an estimate of shades of dark or light rather more difficult. Two of the series, from Kirui and Kaimosi, are unusually dark, even the tails being almost wholly black with the exception of the gray-based hairs at their proximal end.

Measurements. ♂. (Tsavo) 560. 410. 101. 38 mm., ♀. (Kirui) 570. 450. 123. 45 mm.

Dict. At Kaimosi one mongoose had a rat (*Otomys t. elgonis*) and the scales of a viper (*Bitis nasicornis*) in its stomach, another a few small bones, snake's eggs, what were apparently lizard's eggs, together with a mass of beetle and other insect remains. The stomach of the Kibwezi mongoose was crammed with grasshoppers. The Tsavo animal had some scraps of meat but mostly vegetable matter. I shot this mongoose as it was sniffing at the carcass of a hyrax at 12.30 A.M. A second mongoose came at 4 A.M. but I missed it.

Parasites. Nematodes (*Physaloptera* sp.) were found in the stomach of a Kaimosi mongoose.

HELOGALE UNDULATA RUFULA Thomas

Helogale undulata rufula Thomas, 1910, Ann. Mag. Nat. Hist. (8), 5, p. 194: Rogoro, Kikuyu, Kenya Colony.

♀ (M. C. Z. 32132) Tsavo, K. C. 31. iii. 34.

♀ (M. C. Z. 32330) Mt. Mbololo, K. C. 26. iv. 34.

Native name. Munuru (Kitaita).

Coloration. The small mongooses of this genus seem rather variable in coloration, but it is not altogether clear as yet how far this is an individual matter.

Measurements. ♀. (Mbololo) 460. 165. 43. 20 mm.

Breeding. ♀ juv. (Tsavo) 180. 140. 43. 16 mm.

Habitat. The young mongoose was shot in the head with dust-shot from a .22 at a range of ten feet as it peered at me from the base of a thornbush into which it had run.

MUNGOS MUNGO COLONUS (Heller)

Crossarchus fasciatus colonus Heller, 1911, Smithsonian Misc. Coll., 56, No. 17, p. 16: Southern Guaso Nyiro, Kenya Colony.

♀ (M. C. Z. 32331) Voi, K. C. 17. iv. 34.

Native name. Munuru wa sanga (Kitaita).

Distribution. In addition to the single specimen from Voi, a cranium was picked up in a cave near Kemp's Cave above Kirui, southeast face of Mount Elgon. The Banded Mongoose seems to be much less common in Kenya Colony than it is farther south.

Measurements. ♀ juv. 342. 222. 72. 21 mm.

FELIDAE

FELIS (LEPTAILURUS) CAPENSIS HINDEI Wroughton

Felis capensis hindei Wroughton, 1910, Ann. Mag. Nat. Hist. (8), 5, p. 205: Machakos, Kenya Colony.

Felis capensis kemp Wroughton, 1910, Ann. Mag. Nat. Hist. (8), 5, p. 206: Kirui, Mount Elgon, Kenya Colony.

♂ (M. C. Z. 31620) Kaburomi, U. 28. xii. 33.

♀ (M. C. Z. 31950) Golbanti, K. C. 25. vi. 34.

Native names. Korobat (Kisabei); lutuku (Lugishu); indamamweli (Luragoli and Lutereki).

Coloration. Hollister (1918, p. 175) has indicated that there seem to be no good reasons for recognizing a Mount Elgon race of serval, distinct from that of the lowlands to the southeast. The male secured by Loveridge at 10,500 feet on Mount Elgon is quite like one in the Museum collection from Kijabe, representing *hindei* with a similarly ochraceous-buff background above. On the other hand, the Golbanti skin from the coast is very much paler in the general tone, with pale buffy sides and feet, shading to nearly ochraceous buff in the very middle line of the back. It is a very good match for another specimen from Mwanza, south shore of Lake Victoria, so that the series at hand shows no clear distinction of a paler coastal and a richer-colored inland form, though possibly of a paler, more southern one. We have for the present, therefore, tentatively referred both to *hindei*.

Measurements. ♂. 870. 280. 185. 86 mm., ♀. 820. 300. 190. 88 mm.

Breeding. Regretfully one noted that the Golbanti serval, disturbed in long grass and shot on the run, was nursing a family.

Diet. Feet and fur of a mole rat (*Tachyoryctes ruddi*) in the Kaburomi animal, two rats (*Mastomys c. hildebrandti*) and two Harlequin Quail (*Coturnix delegorguei*) in the Golbanti specimen.

Parasites. Hippoboscid flies (*Hippobosca longipennis*) were very abundant in the fur of the female.

FELIS OCREATA NANDAE Heller

Felis ocreata nandae Heller, 1913, Smithsonian Misc. Coll., 61, No. 13, p. 14:
Lukosa River, Nandi Escarpment, Kenya Colony.

2 ♂ 6 ♀ (M. C. Z. 32263-70) Near Lukosa R., Kaimosi, K. C.
14. ii.-7. iii. 34.

Native names. *Lugaho* (Luragoli); *shitarongo* (Lutereki).

Coloration. This topotypic series shows much variation in the tint of the occiput and ears, much more mixed with black in some than in others, while the backs of the ears are nearly red or in others blackish. In two new-born kittens the pattern of indistinctly-marked cross-stripes and spots of black is much more obvious than in the adults which tend to lose all the body markings, and develop a nearly uniform buffy-gray coat with faint indications of the stripes; in the kittens the fine longitudinal black stripes are clearly marked but disappear in the adults.

Measurements. ♂. 505. 300. 117. 57 mm., ♀. 570. 352. 130. 64 mm.

Breeding. On March 6, 1934, two kittens, apparently only born that day were brought in, they measured: ♂. 152. 70. 36. 15 mm.,

♀. 155. 70. 36. 15 mm. On February 25, a half-grown kitten was collected.

Diet. Four swamp rats (*Dasymys h. helukus* and *Otomys t. elgonis*) were recovered from the stomachs of three cats, those of all the rest were empty.

Enemies. The natives frequently find the kittens of the wild tabby and take them to their huts where they remain for a time. One such, judging by its cropped ears, had evidently been in captivity for some time.

LORISIDAE

PERODICTICUS POTTO IBEANUS Thomas

Perodicticus ibeanus Thomas, 1910, Abstr. Proc. Zool. Soc. London, No. 81, p. 17: Kakamega Forest, Kenya Colony.

3 ♂ 2 ♀ (M. C. Z. 31117-21, 31720) Kaimosi, Kakamega Forest, K. C. 23. ii.-9. iii. 34.

Distribution. The potto has never been recorded from Mount Elgon, but the two Bagishu skimmers from Sipi, western slopes of Elgon, were most emphatic that it is known to them.

Native names. *Likene* (Luragoli); *shakami* (Lutereki).

Coloration. Considerable variation in color is displayed by this series of topotypes; Hollister (1924, p. 11) pointed out the same thing with regard to his series of five from this locality. The general ground color varies from a distinctly grayish buff to a pale ochraceous, much mixed with black above, especially on the shoulders. The white tipping of the hairs, if present, results in a frosted appearance, but this is characteristic of immaturity according to Schwarz (1931, Ann. Mag. Nat. Hist. (10), 8, p. 249). It might be pointed out that the correct spelling of the type locality is Kakamega, not Kakumega, and it is in Kenya Colony, not Uganda as stated by Schwarz.

Measurements. ♂. 340. 65. 75. 24 mm., ♀. 350. 74. 80. 29 mm.

Diet. Dr. P. J. Darlington has kindly examined the stomach contents of one of these animals and reports it to consist of: Fragments and whole examples of some fifteen to twenty ants; pieces of several beetles, probably Scarabaeidae; hair; cotton or plant fibres; plant fragments resembling grasses.

Notes. On the night of our arrival at Kaimosi, February 7, I heard what I took to be a potto in a tree near my tent. A few nights later I definitely heard one in a tree over the tent, the next night at 8.30 p.m. it was startled into defaecating on the tent by a noisy party of natives

returning homewards along the road. I ran outside with a flashlight and shone its eyes. These glowing eyes seemed very close, so fearful of damaging a valuable specimen I backed off thirty feet further before firing with No. 8 shot from an open barrel. The animal made off and daylight revealed that I was really too far away.

I then offered a reward of two shillings (50 cents U. S.) for the first potto to be brought in but had to wait a fortnight before one turned up. This potto was alive and practically uninjured having received only a slight bite from a dog on its right hind foot. It was slow and clumsy on the ground but clambered quickly about trees. When put on small trees it invariably clambered downwards, head down, and went in search of a larger tree. Another potto showed that they can really make quite a respectable pace on the ground when so inclined. If molested, they would turn and snap with astonishing rapidity.

The best account of the habits of this creature will be found in Pitman (1931, "A Game Warden among his Charges." London, pp. 158, 274).

Parasites. A tick (*Ixodes ugandanus*) in the fur of one, and a nematode in the stomach.

GALAGIDAE

GALAGO CRASSICAUDATUS LASIOTIS Peters

Galago lasiotis Peters, 1877 (1876), Monatsb. Akad. Wiss. Berlin, p. 912: Mombasa, Kenya Colony.

Galago crassicaudatus lasiotis Schwarz, 1931, Ann. Mag. Nat. Hist. (10), 7, p. 41.

♂ ♀ (M. C. Z. 31721-2) Mt. Mbololo, K. C. 19 & 28. iv. 34.

Native name. *Mwongagi* (Kitaita).

Coloration. Hollister (1924, p. 12) mentions a specimen from this locality which had a white tail tip. The amount of white at the tip is subject to variation. One of our specimens has the terminal third of the tail dark blackish brown, while in the other the distal third is a mixture of pale gray and dark brown but no white.

Measurements. ♂. 260. 50. 45 mm., ♀. 290. 370. 85. 45 mm.

Habitat. The male was shot within a few hundred feet of the male *Galago s. braccatus* in the rain forest capping the mountain at 4,800 feet. Both were shot the same night at about 7.30 p.m. by shining their eyes, a rather difficult business for these galagoes turn away

their heads or conceal their eyes very quickly after the light is turned upon them. The second specimen was killed by a native near the foot of the mountain at about 1,500 feet.

GALAGO SENEGALENSIS ALBIPES Dollman

Galago braccatus albipes Dollman, 1909, Ann. Mag. Nat. Hist. (8), 4, p. 549: Kirui, Mount Elgon, Kenya Colony.

Galago senegalensis albipes Schwarz, 1931, Ann. Mag. Nat. Hist. (10), 7, p. 41.

♂ (M. C. Z. 31288) Sipi, U. 21. xii. 33.

♂ ♀ (M. C. Z. 31286-7) Kirui, K. C. 18 & 20. i. 34.

Distribution. This, according to Schwarz, is the form of *senegalensis* inhabiting the "uplands of Kenya Colony west of the Rift Valley." In addition to the specimens listed above, the Museum of Comparative Zoölogy has one from Mwanza and another from thirty miles south of Tabora, Tanganyika Territory. These are so closely similar that they must be regarded as representing the same race, having uniformly gray backs, and the limbs (especially the hinder pair) faintly washed with buffy.

Native name. *Karara* (Lugishu); *kaerarut* (Kimasai); *makwinyet* (Kitosh).

Measurements. ♂. (Kirui) 200. 270. 70. 46 mm., ♀. 180. 230. 65. 42 mm.

GALAGO SENEGALENSIS BRACCATUS Elliot

Galago braccatus Elliot, 1907, Ann. Mag. Nat. Hist. (7), 20, p. 187: Tsavo River, near Mount Kilimanjaro, Kenya Colony.

Galago senegalensis braccatus Schwarz, 1931, Ann. Mag. Nat. Hist. (10), 7, p. 41.

♀ (M. C. Z. 31724) Tsavo River, K. C. 31. iii. 34.

♂ (M. C. Z. 31725) Mt. Mbololo, K. C. 19. iv. 34.

Native name. *Monarang* (Kitaita).

Coloration. The topotype has the outer side of the limbs and the middle of the belly washed with pale yellow.

Measurements. ♂. 160. 170. 26. 30 mm., ♀. 170. 240. 60. 42 mm.

CERCOPITHECIDAE

CERCOPITHECUS NICTITANS SCHMIDTI Matschie

Cercopithecus schmidtii Matschie, 1892, Zoöl. Anz., 15, p. 161: Forest between Mengo and Mjongo, Uganda.

Lasiopyga ascanius kaimosae Heller, 1913, Smithsonian Misc. Coll., **61**, No. 17, p. 10: Upper Lukosa River, near the mission station of Kaimosi, Kenya Colony.

3 ♂ 10 ♀ (M. C. Z. 31984, 31988-96, 31998-32000) Upper Lukosa River, Kaimosi, K. C. 19. ii.-3. iii. 34.

Distribution. This species has not been recorded from Mount Elgon but I observed two red-tailed monkeys, which I feel reasonably certain were of this race, in company of a troupe of blue monkey (*C. m. stuhlmanni*) at Sipi.

Native names. *Enhondo* (Luragoli); *ikhondo* (Lutereki).

Measurements. ♂. juv. 220. 295. 76. 26 mm., ♀. 490. 680. 125. 25 mm.

Breeding. One of the females shot on March 3 contained an embryo, two others were carrying young of different ages, these measured: ♂. 185. 271. 67. 27 mm., ♂. 195. 295. 78. 22 mm.

Enemies. Both Bagishu and Watereki eat these monkeys and from the skill with which the Watereki boys and men climb lianas in pursuit of them, I judge that they frequently hunt them.

Habits. I was puzzled, when hunting these monkeys, to note the absence of large males and the preponderance of juveniles. The Watereki who accompanied me, explained that after the first rush of the troupe the males invariably descended to the ground and made off through the underbrush unless the hunters were accompanied by dogs. We tested this statement and found it to be perfectly true. Still there remained the large proportion of young monkeys which, when surprised, made off with shrill piping cries. Undoubtedly the species is very prolific but there seems to be a tendency for the adult females to remain concealed in the foliage when the alarm is given and the youngsters make off. I also observed that where the cover in their immediate vicinity is scanty, the females make a dash for the nearest liana-smothered tree—which are plentiful enough in this magnificent forest—and there seek concealment. Familiar as I am with the ways of colobus and blue monkey, I am confident that neither of these will remain concealed to the extent practised by Schmidt's Monkey. I have known them to remain quietly without giving a sign as the lianas were roughly shaken to the accompaniment of hoarse cries and shouts, nor even move until a climber was within twenty feet of them. On March 3, I shot eight with ten shots, losing none.

CERCOPITHECUS AETHIOPS JOHNSTONI Pocock

(*Cercopithecus pygerythrus*) *johnstoni* Pocock, 1907, Proc. Zool. Soc. London, 2, p. 738: Moshi, south side of Mount Kilimanjaro, Tanganyika Territory.
Cercopithecus aethiops johnstoni Schwarz, 1926, Zeitschr. f. Säugetierk., 1, p. 40.

3 ♀ (M. C. Z. 31947-8, 31975) Kibwezi, K. C. 26. iii. 34.

♂ (M. C. Z. 31961) Golbanti, K. C. 22. vi. 34.

Distribution. Also seen at Tsavo.

Native name. Tsavow (Kitaita).

Discussion. The coastal specimens should be nearly like the supposed races *tumbili* (from Ndi) and *contingua* (from Changamwe). Both these, however, are regarded by Schwarz in his revision as synonyms of *johnstoni*, this race extending from the coast to the Rift Valley in Kenya Colony.

Coloration. These skins are fairly uniform in color, though that of the Golbanti male is distinctly more buffy yellow along the sides than are those of the Kibwezi females.

Measurements. ♂. 390. 500. 118. 33 mm., ♀. 450. 530. 127. 33 mm.

Habitat. These bold little guenons were shot from a large troupe feeding in a wild fig tree close to the station at Kibwezi. The Golbanti monkey was one of two animals in a tree close to the rest house; on picking it up I was surprised to find a cord tightly about, and almost cutting into its waist. As nobody in the village claimed to have lost a monkey it seems possible that it had been caught in a snare and gnawed itself free.

CERCOPITHECUS AETHIOPS CALLIDUS (Hollister)

Lasiopyga pygerythra callida Hollister, 1912, Smithsonian Misc. Coll., 59, No. 3, p. 1: South end of Lake Naivasha, Kenya Colony.

♂ juv. ♀ (M. C. Z. 31997, 32001) Mt. Debasien, U. i. xii. 33.

♀ juv. (M. C. Z. 31614) Kirui, Mt. Elgon, K. C. 1. ii. 34.

Native names. Akwadogot (Karamojong); chokea (Kisabei); musoni (Lugishu).

Measurements. ♀. 515. 560. 115. 33 mm.

Breeding. This female was nursing a young male which was chloroformed on January 1, 1934, when it measured 212. 270. 68. 28 mm.

Notes. These guenons are common along the gallery forest fringing the Amaler River from 5,000 feet down to the plains of western Debasien. Several times troupes slept in the trees in the vicinity of our camp. On November 30 several were secreted in a small but dense clump of foliage in a tall tree at the edge of our camp clearing. They

remained close until stones rattling through the foliage caused a small monkey to dash out, it was followed shortly afterwards by a monkey carrying a young one on her breast. I could have shot either but refrained. There were plenty of other monkeys in the trees round about but very wary.

On returning to camp at noon on December 1, I was told that monkeys had been in the vicinity all morning; just at that moment a monkey left the tree from which we had dislodged the trio the previous evening. Thinking that it was a solitary male I shot it, it dropped stone dead; when I picked it up I found that it was a nursing female. Shortly afterwards a young monkey started crying in a nearby tree. Blazio, a Baganda cook who was a splendid climber, brought it down from the very topmost branches; as he ascended we saw the other young monkey leave the tree in full view. It seemed certain that this nursing female was being accompanied by her youngster from a previous birth.

From the very first the baby monkey, which I should judge was about a fortnight old, took to sucking milk from an improvised teat attached to a small bottle. At first he took half-a-bottle at a time but within a fortnight this was increased to two bottles. It was an amusing sight to see him standing on his hind legs and holding on to his bottle with both hands as he rapidly absorbed its contents. What a commotion was raised when the first bottle was finished before the second bottle could be substituted! Three weeks after capture he ate biscuits and banana with gusto.

At first we found this monkey rather a nuisance as he wanted to be carried the whole time and squeaked continually to be picked up if left alone. While carried he looked at surrounding objects with great interest, turning his head this way and that. On safari he was tied up in a white cotton sugar bag, dropped into a haversack which was carried by a native. He appeared to appreciate this manner of travelling for he never cried and seemed willing to forego regular meal times so long as the motion of being carried continued. He sucked the fingers of his right hand continuously. Unfortunately he developed a complaint of the digestive tract which was rather stubborn and it seemed best to chloroform the little fellow.

CERCOPITHECUS MITIS KIBONOTENSIS Lönnberg

Cercopithecus albogularis kibonotensis Lönnberg, 1908, in Sjöstedt, "Wiss. Ergeb. Schwed. Zool. Exped. Kilimandjaro, Meru umgeb. Massai-steppen." 1, No. 2, p. 3: Kibonoto, Mount Kilimanjaro, Tanganyika Territory.

Lasiopyga albogularis maritima Heller, 1913, Smithsonian Misc. Coll., **61**, No. 17, p. 8: Mazeras, Kenya Colony.

Lasiopyga albogularis kima Heller, 1913, Smithsonian Misc. Coll., **61**, No. 17, p. 9: Mount Mbololo, Taita district, Kenya Colony.

Cercopithecus leucampyx kibonotensis Schwarz, 1928, Ann. Mag. Nat. Hist. (10), **1**, p. 655.

♂ (M. C. Z. 31935) Kibwezi, K. C. 24. iii. 34.

♂ (M. C. Z. 31937) Mt. Mbololo, K. C. 14. iv. 34.

2 ♂ 3 ♀ (M. C. Z. 31936, 31962-3, 31973, 32288) Ngatana, K. C. 11-15. vi. 34.

Native names. *Ngima* (Kitaita); *chima* (Kipokomo). Being corruptions of the Kiswahili *kima*.

Discussion. The specimen from Mount Mbololo is a topotype of Heller's race, *kima*, but though Hollister (1924, p. 36) treated *kima* as well as the supposedly paler race *maritima* as distinct, Schwarz (1928, p. 655) relegates both to the synonymy of *kibonotensis*.

Coloration. In our Mbololo specimen the white collar is much less nearly complete than is the case with the Kibwezi monkey where it lacks about 35 mm. of forming a complete ring.

Measurements. ♂. (Mbololo) 595. 660. 150 40 mm., ♀. 470. 670. 120. 37 mm.

Parasites. Nematodes (*Abreviata* sp.) were present in Ngatana specimens.

Enemies. Deadfall traps are employed by the Wapokomo to kill these monkeys which they prize as an article of diet.

Habits. These monkeys are very abundant on the summit of Mount Mbololo and, strangely enough, are much less wary than the other creatures of the forest, be they squirrels, blue duiker or hyrax. It may be that they are no longer hunted for food by the Wataita. With a little cautious stalking, one might be certain almost any morning of surprising a party feeding, always a pleasant sight, and watch them until detected by some member of the troupe when all would go bounding away for a short distance. Vocally they were very quiet, their presence only being betrayed by movements of the foliage or the dropping of rejected fragments. Occasionally the piping whistle of a young monkey would be heard or more rarely still the deep grunt of a male who had detected the intruder from afar.

CERCOPITHECUS MITIS STUHLMANNI Matschie

Cercopithecus stuhlmanni Matschie, 1893, Sitz. Ges. naturf. Freunde Berlin, p. 225: North of Kingawana, between Lakes Albert Edward and Albert, Belgian Congo.

Cercopithecus leucampyx elgonis Lönnberg, 1919, Rev. Zoöl. Afr., 7, p. 134: Mount Elgon.

♀ ♀ (M. C. Z. 31986, 32003) Sipi, U. 21. xii. 33.

♀ ♀ (M. C. Z. 32002, 32004) Butandiga, U. 10. i. 34.

♂ ♀ ♀ (M. C. Z. 31615, 31985, 31987) Elgonyi, K. C. 25. i. & 4. ii. 34.

Distribution. Mount Elgon apparently marks the northeastern limit of the range of this subspecies.

Native names. *Sivul* (Kisabei); *ekobe* (Lugishu); *sibolit* (Kimasai); *kikutusi* (Kitosh); *imwawihondo* (Lutereki).

Discussion. Schwarz (1933, Zeit. für Säugetierk., 8, p. 278) has shown that *mitis* should replace *leucampyx* as the specific name for the monkeys of this group. Previously he stated that Lönnberg's *elgonis* is a synonym of *stuhlmanni*, a conclusion in which we would concur after comparing the seven Elgon skins listed above with one from the forests of eastern Ruwenzori.

Measurements. ♂. juv. 305. 423. 105. 77 mm., ♀. (Sipi) 570. 730. 140. 38 mm.

Breeding. On January 10, I fired at a monkey hiding in dense foliage and it proved to be a nursing female with a young one (♀. 285. 362. 82. 30 mm.), both were killed outright with No. 3 shot in the head. There was a fetus in a female killed at Elgonyi on February 4, 1934.

Enemies. The blue monkey is much hunted by the Bagishu for its flesh; at Sipi a small crowd collected while the animals were being skinned. The bodies were carried off by a wrangling party of natives who all but fought over the division of the meat, later one encountered individuals carrying off limbs carefully wrapped in banana leaves. At Butandiga the carcasses were similarly in great demand.

Habits. As with allied races it was found that these blue monkeys associated with troupes of colobus, apparently for mutual protection.

CERCOPITHECUS NEGLECTUS Schlegel

Cercopithecus neglectus Schlegel, 1876, Mus. des Pays-Bas, Simiae, p. 70: White Nile(?).

♂ (M. C. Z. 31616) Kirui, K. C. 5. ii. 34.

Distribution. The type of this species, now in the British Museum, was secured by Petherick on the White Nile, but Schwarz doubts if this is the actual place of its origin. Elliot refers to other specimens in the British Museum from north of Lake Rudolf. The general range

is thus across the great forest westward to the mouth of the Congo, whence, near Brazzaville, came the type of *brazzae*, regarded by Schwarz as a synonym. Our specimen appears to be the first recorded from Mount Elgon, Kirui's village being on the southern slopes.

Discussion. The skull, compared with that of *C. m. stuhlmanni*, shows a number of minor differences, particularly in the width of the posterior narial opening and in the form of the audital bullae which converge to form a deep keel anteroventrally.

Coloration. This Elgon example has the tail black mixed with whitish hairs quite to the tip, instead of being all black as in two specimens from the Cameroons and a third from southeastern Congo. Possibly after all, *brazzae* may prove to be a recognizable western race.

Measurements. ♂. 595. 630. 148. 38 mm.

Note. This monkey was killed by a native, aided by his dog, and brought into camp in the flesh.

CERCOCEBUS GALERITUS GALERITUS Peters

Cercocebus galeritus Peters, 1879, Monatsb. Akad. Wiss. Berlin, p. 830, pls. iB and iii: Miatola, mouth of Osi and Tana Rivers, Kenya Colony.

♂ (M. C. Z. 31934) Wema, Ngatana, K. C. 16. vi. 34.

Distribution. Very little is known of this mangabey, which seems to be confined to the gallery forest along the lower reaches of the Tana River. It is the only East African representative of the genus east of the general bounds of the central African forests.

Native name. *Garawa* (Kipokomo).

Measurements. ♂: 600. 620. 158. 39 mm.

Diet. According to the Wapokomo these animals raid their rice crops but only when such are in close proximity to the forest.

Habits. At dawn one hears the deep-toned bark of the old males soon to be followed by the squeals of the younger mangabeys. The troupes keep much to the ground in the forest though ascending the trees to feed, or when disturbed, to see who is coming. Having located the danger, they drop to the ground and run off to the accompaniment of an uproar such as one associates with baboons. Sections of the forests were waterlogged and here I encountered the mangabeys in the trees as I waded about in the knee-deep water.

PAPIO FURAX Elliot

Papio furax Elliot, 1907, Ann. Mag. Nat. Hist. (7), 20, p. 498: Lake Baringo, Kenya Colony.

♂ (M. C. Z. 32006) Kirui, K. C. 6. ii. 34.

♀ (M. C. Z. 31619) Kaimosi, K. C. 19. ii. 34.

Native names. *Echum* (Karamojong); *nyanya* (Kimasai); *ngugi* (Luragoli and Lutereki).

Discussion. These are referred to *P. furax*, although until a general review of the baboons can be made, it is not possible to make a final estimate of the validity of some of the forms. According to Hollister (1924, p. 18) this species "is readily distinguishable by the shortness of the rostral portion of the skull" from other East African forms. In the Kaimosi skull the distance from the rim of the orbit to the tip of the premaxillary is 99 mm.

Coloration. This Kaimosi specimen, an adult female, has the central area of the backs of hands and feet blackish with a few ochraceous hairs, and bordered by a paler area. The general color is ochraceous mixed with black.

Measurements. ♂ juv. 340. 255. 115. 52 mm., ♀. 710. 350. 181. 52 mm.

Diet. Green vegetable matter in both stomachs, maize being recognizable.

Folklore. The following tale is from the Maragoli of Kaimosi. One day a man named Madugi was digging a pit in the forest in which to trap animals. As he was digging, some baboons passed by and hailed him. He answered "Yoo," then the baboons asked why was he digging. "I am digging for rats," replied Madugi. "Perhaps you are digging a trap in which to catch us and other animals," suggested the baboons. The man denied this, asserting that he was only digging for rats. However the baboons would not believe him, saying, "We, ourselves, know that indeed it is a trap which you are digging, come now we will fight with you over this." "With what kind of sticks shall we fight?" asked Madugi. The baboons answered, "We will fight with *tsikhuvu* (a species of shrub with many leaves)." The man agreed for he knew that *tsikhuvu* could not harm anyone.

Madugi then procured a branch of *tsikhuvu* and concealed a sword among the leaves. When he was ready he invited the baboons to select one of their number to fight him, and this being done, cried, "Come on and fight, you may begin." The baboon, armed with a *luhuvu* (singular, i.e. one branch) hit the man and Madugi struck back, his hidden sword piercing the baboon. "With what are you cutting me," cried the baboon. Madugi lied, saying, "Nothing, this is only *tsikhuvu*." They continued the fight and as before the baboon

was wounded by the concealed weapon. This time the baboon cried out, "You are cutting me with a sword." "True," said Madugi, "I have a sword." As soon as they heard this all the other baboons fled and Madugi killed the baboon with whom he had been fighting. Then the man returned home and boasted of the fight in which he had killed a baboon by deceit and treachery.

One day, a long time ago, a certain woman took her baby with her when she went to work in her garden. She did this because she had no little nurse girl with whom to leave the baby. On arriving at the garden she laid the sleeping child in the shade of a tree. Then she proceeded to plant the grain. Later, when the mother returned to get the child she failed to find it. She thought that perhaps she had forgotten just where she had placed it, and was hunting round about when a baboon calling to her, said, "I, myself, stole your child." Then the mother answered, "Oh, please give me my child, I am ready to return home." The baboon answered, "No, I, myself, will not give you your child because I like to look at it."

The distracted woman returned home to tell her husband. On hearing the news the man called together the villagers and said, "My wife took our child with her when she went to work in the garden, and now a baboon has stolen the child." The neighbours replied, "Ask your wife to show us this baboon." The woman accompanied them and pointed out the tree into which the baboon had climbed with the child. On seeing the people peering up into the tree, the baboon called to them, saying, "What will you do if I kill this child." The people answered, "You had better give up the child." The baboon replied, "Leave the child and let me play with it." On hearing this some of the neighbours said, "It would be well to shoot the baboon with an arrow and recover the child." Others objected, saying, "It would be unwise to kill the baboon, let him play with the child until he is tired." The mother of the child also agreed, saying, "It would be best to leave the child with him." It was now about six o'clock in the evening when the people started back to their homes leaving the child with the baboon.

About two hours later the baboon brought the child and placed it outside the door of the mother's hut, then it took some water and poured it over the child so that the baby cried. The baboon called out, "I, myself, have brought your child." Then the mother knew that her baby had been returned alive and there was great rejoicing in the home that night.

PAPIO IBEANUS Thomas

Papio thoth ibeanus Thomas, 1893, Ann. Mag. Nat. Hist. (6), 11, p. 46: Lamu, Kenya Colony.

♂ (M. C. Z. 31949) Voi, K. C. 11. iv. 34.

Skull (M. C. Z. 32287) Kitau, Manda Id., K. C. 15. v. 34.

Type locality. This baboon does not occur at Lamu township on Lamu Island except in captivity. It is, however, exceedingly abundant on the mainland which was formerly known as Lamu district, or loosely "Lamu" in the vague way that "Zanzibar" was also applied to the mainland opposite though with better justification.

Distribution. Also seen at Kibwezi, Tsavo and Witu. In the dom palm forests just north of Witu they were both numerous and bold, finding a plentiful supply of fruit in the mango trees scattered through the bush, eloquent testimony to the fact that much of this region was under cultivation in the slave era.

Native name. *Fubi* (Kitaita).

Discussion. The topotypic skull from Manda Island, Lamu district, is that of a very old male. As the result of an injury, or possibly caused by an abscess resulting from a broken canine, considerable necrosis has taken place in the right suborbital region. The edges of the bone have become somewhat smoothed with a slightly irregular bony deposit at the front and rear edges of the lesion. In this old male, the sutures have all fused, even those of the nasals are quite obliterated. The teeth are worn but in good condition, except that the crown of the middle molar below the wound has gone, and the right canine is broken off. The last molar of the left side is missing and its alveolus wholly resorbed.

The specimen from Voi is provisionally regarded as the same although the rostrum of the skull is considerably shorter, being 109 mm. from orbit to tip of premaxillary as against 124 mm. in the big male from Kitau. Its coat is pale buffy gray, only slightly mixed with black, but it is rather worn and perhaps faded.

Measurements. ♂. 800. 620. 315. 70 mm.

PITHECIDAE

COLOBUS POLYKOMOS MATSCHIEI Neumann

Colobus matschici Neumann, 1899, Sitz. Ges. naturf. Freunde Berlin, p. 15: Kwa Kitoto, near Kisumu, Kenya Colony.

Colobus occidentalis matschiei Hollister, 1924, U. S. Nat. Mus., Bull. 99, p. 45.

Colobus abyssinicus elgonis Granvik, 1924, Lunds Univers. Arsskr. N. F., 21, No. 3, p. 4: Mount Elgon, Kenya Colony.

♂ (M. C. Z. 31105) Mt. Debasien, U. 16. xi. 33.

♂ ♀ (M. C. Z. 31106, 31617) Elgonyi, K. C. 25. i. 34.

♂ (M. C. Z. 32005) Nandi Forest, K. C. 14. ii. 34.

Distribution. Said not to occur at Sipi and Butandiga on western Elgon but in the forests above the latter locality. Formerly present in the Sipi forests but exterminated by the Bagishu hunters.

Native names. *Echumwa* (Karamojong); *mangesia* (Kisabei); *lilubis* (Lugishu); *mongesiet* (Kimasai); *kendubisi* (Kitosh); *induviri* (Luragolis); *nduviri* (Lutereki).

Coloration. Both Elgonyi specimens have the white brow band wide and continuous; in the Debasien animal it is a trifle narrower. In the former the shoulder stripe nearly reaches the white of the cheeks, but in the latter it is separated from the cheeks by a wider space.

Measurements. ♂. (Elgonyi) 650. 640. 180. 40 mm., ♀. 630. 630. 168. 38 mm.

Breeding. Immediately after I shot the Elgonyi female, a big young guereza, which had been concealed higher up in the same tree unknown to me, made off. Though not entirely weaned it was well able to take care of itself.

The juvenile male (370. 420. 125. 32 mm.) from the Nandi Forest twenty-five miles east of Kaimosi, was being hugged by its mother, despite its large size. They separated when disturbed. Its stomach held only vegetable matter as far as one could see; there was no trace of milk.

Enemies. Some Karamojong refused the meat of the Debasien colobus but it was eaten by a party of Acholi in search of work.

Habitat. The Debasien colobus was shot from a party of half-a-dozen in the large wood between the last two hills at the western foot of the mountain. They were fairly plentiful and exceedingly tame on the mountain above 7,000 feet.

In the Elgonyi forest, though their deep throaty cries were heard at least once a day, generally towards sunset, or in response to a shot, I should say that they are not common. A four-hour hunt only revealed two.

COLOBUS BADIUS RUFOMITRATUS Peters

Colobus rufomitratatus Peters, 1879, Monatsb. Akad. Wiss. Berlin, p. 829, pls. ia and ii: Muniuni, Kenya Colony.

Colobus badius rufomitatus Schwarz, 1928, Zeitschr. für Säugetierk., **3**, p. 95.

3 ♂ 1 ♀ (M. C. Z. 31938-41) Wema, Ngatana, K. C. 13 & 16. vi. 34.

Distribution. The four specimens of this rare monkey are from the forests near Wema and Ngatana villages about thirty miles in a direct line from the mouth of the Tana River, therefore not far from the type locality. The type, a male, is in the Berlin Museum; in addition there are a pair from the lower Tana in the British Museum which, according to Schwarz, agree perfectly with the type.

Native name. *Mbalawasi* (Kipokomo).

Discussion. Schwarz (1928, p. 95) in his review of the red colobi, regards *rufomitatus* as a geographic race of *C. badius*, the distribution of which as a species, is now more discontinuous in eastern Africa than that of the black-and-white group for there seems to be no representative of it in Kenya Colony except in this limited area of gallery forest along the lower Tana.

Coloration. Elliot (1912, **3**, p. 123) in his Review of the Primates, states that *tephrosceles*, the Ruwenzori representative of this form, differs, among other points, in not having any black on the head between the lateral tufts. The Ngatana skins, however, are also without black in this area, the entire crown being uniformly rufous.

Measurements. ♂. 600. 650. 168. 35 mm., ♀. 535. 605. 157. 35 mm. All the males have the same length from snout to anus.

Diet. The Wapokomo stated that these monkeys rarely descend to the ground and never molest their crops of corn and rice which abutted on the forests in which the animals were shot.

Enemies. Neither the Wapokomo nor other natives would touch the meat of these guerezas. Probably freedom from molestation accounts for the quiet way in which these monkeys sunned themselves when it was reasonably quiet.

ANOMALURIDAE

ANOMALURUS JACKSONI de Winton

Anomalurus jacksoni de Winton, 1898, Ann. Mag. Nat. Hist. (7), **1**, p. 251: Entebbe, Uganda.

3 ♀ (M. C. Z. 32335-7) Sipi, U. 18-26. xii. 33.

Distribution. It is not generally known that this scaly-tail occurs in Kenya Colony but a native-made skin was seen at Kaimosi, the animal having been killed locally.

Native names. *Chebkwowe* (Kisabei); *kapa* (Lugishu); *ekima* (Kitosh); *musiondet* (Kimasai); *lisimba* (Lutereki).

Coloration. Two of these flying squirrels are quite as described by de Winton, dark gray above, paler on the forehead, and blackish towards the edge of the membranes; a black muzzle and band through the eye, and a blackish spot about the base of the ear. The third has the ear spot and crown of the head rusty reddish, slightly mixed with grayish, while the hind feet, tibia, as well as the surrounding membrane, and a small area posterior to the forearm, are also rusty. A slight tinge of the same is present along the middle half of the tail, and shows faintly in its blackish terminal tuft.

Measurements. ♀. 380. 210. 62. 41 with a "wing" of 196 mm.

Diet. The stomachs of two were full of a mealy substance and free of parasites.

SCIURIDAE

HELIOSCIURUS RUFOBACHIUM NYANSÆ (Neumann)

Sciurus nyansæ Neumann, 1902, Sitz. Ges. naturf. Freunde Berlin, p. 56: Kwa Kitoto, near Kisumu, Kenya Colony.

9 ♂ 1 ♀ (M. C. Z. 30761-2, 30764-70) Sipi, U. 13-20. xii. 33.

♀ (M. C. Z. 30773) Butandiga, U. 15. i. 34.

3 ♂ 1 ♀ (M. C. Z. 30763, 30771-2) Elgonyi, K. C. 25. i. & 5. ii. 34.

4 ♂ 3 ♀ (M. C. Z. 30760, 30774-8) Kaimosi, K. C. 19. ii.-7. iii. 34.

Distribution. Said by the natives to occur at Kaburomi (10,500 feet) in the alpine zone of Mount Elgon, but rare at this altitude. This squirrel, which is so common in the Elgon forests, like the local race of *Protoxerus* at Kaimosi, seems to represent a northeastward outpost of the species, which is characteristic of the rain forest areas.

Native names. *Kwereru* (Kisabei); *kau* (Lugishu); *emuna* (Kitosh); *gererut* (Kimasai).

Measurements. ♂. (Sipi) 255. 240. 50. 17 mm., ♀. (Sipi) 242. 240. 40. 17 mm.

Breeding. At Sipi, on December 12, 1933, a single large embryo was preserved from the uterus of one female, while two embryos were present in a second. At Kaimosi, on March 7, 1934, I heard a subdued cry of *kwek-kwek* in the undergrowth near my tent and surprised two young squirrels about the size of a little male (145. 140. 46. 14 mm.) shot on February 25, 1934.

The breeding season is evidently early in the year in this locality

for Heller collected very young squirrels at Kaimosi towards the end of January.

Parasites. Nematodes were numerous in the stomachs of Sipi and Kaimosi squirrels, those from the former locality have been identified by Dr. J. H. Sandground as *Protospiura muricola* and *Strongyluris* sp.

HELIOSCIURUS UNDULATUS SHINDI Heller

Heliosciurus rufobrachiatatus shindi Heller, 1914, Smithsonian Misc. Coll., 63, No. 7, p. 7: Summit of Mount Umengo, Taita Hills, Kenya Colony.

2 ♂ (M. C. Z. 32333-4) Mt. Mbololo, K. C. 14 & 19. iv. 34.

Distribution. Mount Mbololo being just across the valley from Mount Umengo, these specimens are practically topotypes of the race described by Heller on the basis of a single squirrel. His notes are quoted by Hollister (1919, p. 12) to the effect that this form is confined to the remnant of forest capping the extreme summits of the Taita Hills where it is rare, for the type was the only individual seen during a fortnight's stay on Umengo.

Native names. Heller states that *shindi* is the Wataita name of this animal whereas my information is that *shindi* is Kisagalla, and *orosh* the Kitaita name.

Coloration. The two additional specimens listed above, bear out the characters originally claimed for this race, viz. that the underside differs from that of typical *undulatus* in its much paler buffy tint. The throat and upper chest as well as the lower abdomen are much mixed with whitish, forming conspicuous pale areas, as well. The squirrels of this group resemble *multicolor* in having a broad orange band to the hairs of the dorsum, concealed by the succeeding black band and pale tip.

Measurements. ♂. 238. 285. 53. 18 mm.

Habitat. Both were shot within thirty yards of the same spot at 4,800 feet on the very summit of Mount Mbololo, and were the only ones seen during a fortnight's camping on the summit.

HELIOSCIURUS MULTICOLOR ELEGANS Thomas

Heliosciurus multicolor elegans Thomas, 1909, Ann. Mag. Nat. Hist. (8), 4, p. 103: Mount Elgon, Kenya Colony.

♂ ♀ (M. C. Z. 31282-3) Karita River camp, Karamojo, U. 9. xi. 33.

4 ♂ 1 ♀ (M. C. Z. 31277-80, 31285) Mount Debasien, U. 14. xi-1. xii. 33.

Distribution. This squirrel was not met with on Mount Elgon; it is

probably found on the eastern slopes where the dry conditions approximate more to those of Mount Debasien.

Native names. *Eles* (Karamojong).

Coloration. This is a pale squirrel with white underparts, and a pattern of dorsal hairs resembling that of *Heliosciurus undulatus* in having a blackish base, followed by a wide orange-rufous band, then a black band and a pale tip. The orange-rufous band is concealed by the terminal parts of the coat.

Measurements. ♂. 223. 224. 38. 14 mm., ♀. 215. 250. 46. 12 mm. Both from Mount Debasien, the Karita River squirrels being sub-adult.

Diet. The Karita River specimens betrayed their presence by the dropping of acorns as they fed in a big tree beneath which my tent was pitched.

Disease. The genital region of one male was diseased, characterized by a huge swelling which the native skinner reported as being full of aqueous matter.

Habitat. All the Debasien squirrels were shot in gallery forest along the Amaler River or adjacent dry watercourses above 5,000 feet.

PROTOXERUS STANGERI BEA Heller

Protoxerus stangeri bea Heller, 1912, Smithsonian Misc. Coll., 59, No. 16, p. 2: Lukosa River, Kakamega Forest, Kenya Colony.

9 ♂ 5 ♀ (M. C. Z. 30746-59) Kaimosi, K. C. 9. ii.-7. iii. 34.

Distribution. This fine series of topotypes was secured in the Kakamega Forest by the Lukosa River and neighborhood of Kaimosi. As mentioned by Hollister, the discovery of this race constituted an important eastward extension of the range of this western squirrel.

Native names. *Kisila* (Luragoli); *shiseera* (Lutereki).

Measurements. ♂. 320. 317. 67. 25 mm., ♀. 315. 310. 65. 22 mm.

Breeding. On February 12, 1934, a young ♂. 157. 133. 43. 12 mm. was brought in. It had a pure white tail, totally unlike the adults.

Diet. One male was shot as he descended a tree, head downwards, with a large apple-like fruit, measuring 50 mm. in diameter, in his mouth.

MYOXIDAE

CLAVIGLIS PARVUS PARVUS (True)

Eliomys parvus True, 1893, Proc. U. S. Nat. Mus., 16, p. 601: Tana River, between the coast and Hameye, Kenya Colony.

Graphiurus parvus parvus Hollister, 1919, U. S. Nat. Mus. Bull. 99, p. 154.

♂ (M. C. Z. 32066) Ngatana, K. C. 15. vi. 34.

Native name. *Neki* (Kipokomo).

Discussion. This solitary example of the dormice of this group is referred to True's species, of which it is a topotype, although it seems likely that it may prove to be conspecific with *microtis* when the inter-relationships of the dormice can be worked out more carefully.

Coloration. Its short gray fur, white hind feet and less gray under-side are distinguishing characters from the group to which *saturatus* belongs.

Measurements. ♂. 83. 75. 15. 12 mm.

Habitat. Captured in my tent which was pitched beneath a wild fig tree surrounded by grasslands and swamps, near Wema village.

CLAVIGLIS SATURATUS (Dollman)

Graphiurus microtis saturatus Dollman, 1910, Ann. Mag. Nat. Hist. (8), 5, p. 204: South face of Mount Elgon at 9,000 feet, Kenya Colony.

♀ (M. C. Z. 31589) Mt. Debasien, U. 21. xi. 33.

2 ♂ 12 ♀ 5 yng. (M. C. Z. 31571-88, 31597) Butandiga, U. 8-14. i. 34.

♂ (M. C. Z. 31598) Elgonyi, K. C. 5. ii. 34.

2 ♂ 6 ♀ (M. C. Z. 31590-6, 31599) Kaimosi, K. C. 19. ii.-5. iii. 34.

Distribution. The dormouse from Elgonyi is almost topotypic as it comes from the south face of Mount Elgon at 7,000 feet.

Native names. *Isene* (Lugishu and Kitosh); *kererut* (Kimasai); *kizuguzu* (Luragoli); *shitzigutzu* (Lutereki).

Coloration. In contrast to the series from Mount Elgon, which are unstained below, the specimen from Mount Debasien has the whole ventral side of the throat and upper chest, lips, lower cheeks and fore arms stained a brilliant rusty, probably from some food such as pollen on which it had been feeding.

There is a slight amount of variation in the color of the dorsum, some grayer and darker, some faintly more ochraceous, and a few with a decided brownish tinge, perhaps a result of fading. The dark bases of the belly hairs show through prominently. As usual, many exhibit broken tails with the terminal hairs of the stump white. This large series includes a number of small, youngish examples.

Measurements. ♂. (Kaimosi) 98. 80. 17. 13 mm., ♀. (Debasien) 105. 90. 16. 15 mm.

Breeding. At Butandiga, on January 14, 1934, a single very young dormouse (50. 30. 11. 5 mm.) was brought in, its tail being rat-like, not heavily furred like those of the adults. Four were taken from another nest by a native who did not bring them to me until the following day after two had died. An examination of their stomachs showed that they were still being suckled. The two live ones were hungry and twittering like small birds, warm cow's milk was offered them in the palm of one's hand and they commenced to lap almost immediately. This diet, however, even when diluted did not suit them too well for they developed digestive troubles and succumbed some three weeks later.

Diets. The natives claim that these dormice are very fond of bananas.

Enemies. It was also said that they were very abundant in the Maragoli country (Kaimosi and vicinity) but were being driven away or exterminated by the introduction of roof rats (*Rattus r. kijabius*).

Habitat. During the fortnight that I was at Elgonyi I constantly urged the natives to bring in dormice as I was only two thousand feet below the type locality. But beyond stating that they were familiar with it as a dweller in their bananas at the foot of the mountain, they failed to secure any.

My tent was pitched in a clearing of the forest about fifteen feet from the base of a giant, twisted, forest tree that reminded me of one at Madehani above Lake Nyasa. From that tree I had obtained a series of *Claviglis s. collaris* (Allen & Loveridge, 1933, p. 122) where they were associated with a tree rat (*Hylomyscus weileri*). For several nights after our arrival I visited this tree at Elgonyi with a flashlight but without result. I sent a native up to search for signs of rodents but he failed to find either tracks or nests. After we had been in camp a week we purchased a bunch of unripe bananas and hung them against the trunk of this tree to ripen.

The following day, my wife drew my attention to a couple of bananas that had been slightly eaten. After a careful examination I dismissed the idea of fruit bats being the culprits, then, discovering a dropping wedged between two of the bananas, postulated a dormouse as the robber. I removed the bunch to another place, nailed a rat trap to the branch where the bunch had hung and baited the trap with a fragment of banana. Next morning the bait was gone but the trap unsprung. The day after the bait was again taken and the trap sprung. The third morning furnished the same result as the second nor could I detect hairs upon the cloth which was wound round the wire of the trap to prevent injury to the hoped-for specimen.

An hour before sunset on the third day I was approaching the trap to reset it when I heard a rustle among the dry leaves among the buttress roots of the giant tree. Looking down, I saw the bright eyes of a rat (*Praomys t. jacksoni*) watching me, it was within eighteen inches of my feet and had doubtless just emerged from a cavity at the base of the tree into which it promptly disappeared. I removed the trap from above and set it at the entrance of the hole, then went to dinner. The meal over, I returned to remove a *Praomys* from the trap before resetting it. Five minutes later I heard a snap and going to the trap took out another *Praomys*. Having reset the trap, I put another down at a similar opening on the far side of the tree. I had not left ten minutes when both traps went off almost simultaneously. In one was a third *Praomys* which, like its predecessors, had been killed by a blow on the back of the neck. In the other was a live dormouse held by one foreleg.

CRICETIDAE

DIPODILLUS PUSILLUS (Peters)

Gerbillus pusillus Peters, 1878, Monatsb. Akad. Wiss. Berlin, p. 201: Ndi, Taita, Kenya Colony.

Dipodillus percivali Dollman, 1914, Ann. Mag. Nat. Hist. (8), 14, p. 488: Voi, Kenya Colony.

1 ♂ 12 ♀ (M. C. Z. 32088-91, 32094-7, 32100-4) Voi, K. C. 9. iv. 34.

2 ♂ 3 ♀ (M. C. Z. 32092-3, 32098-9, 32105) Mt. Mbololo. 23. iv. 34.

Distribution. The series from Voi are topotypes of *percivali* which, as previously supposed by Hollister (1919, p. 25), is synonymous with *pusillus* of Peters. The Mbololo series are almost topotypic of the latter.

Native names. *Monguru* (Kisagalla); corrupted to *mongulu* (Kitaita).

Measurements. ♂. (Voi) 98. 100. 20. 9 mm., ♀. (Mbololo) 85. 110. 18. 10 mm.

Breeding. About half the series of eighteen gerbils are immature.

Enemies. One was recovered from the stomach of a sand boa (*Eryx c. loveridgei*).

TATERA VICINA VICINA (Peters)

Gerbillus vicinus Peters, 1878, Monatsb. Akad. Wiss. Berlin, p. 200: Kitui, Ukamba, Kenya Colony.

Tatera mombasae Wroughton, 1906, Ann. Mag. Nat. Hist. (7), 17, p. 493: Takaungu, Kenya Colony.

♂ 2 ♀ (M. C. Z. 32116-7, 32119) Voi, K. C. 10. iv. 34.

♂ (M. C. Z. 32118) Mt. Mbololo, K. C. 28. iv. 34.

Native names. *Gue* (Kisagalla); *ngorobo* (Kitaita).

Discussion. The much more prominently tufted tail-tip and the slightly smaller size (hind foot 31-34 mm.) distinguish this gerbil from *T. nigricauda* which occurs in the same area.

Measurements. ♂. (Mbololo) 125. 170. 32. 18 mm., ♀. (Voi) 124. 110. 27. 22 mm.

TATERA NIGRICAUDA NIGRICAUDA (Peters)

Gerbillus nigricaudus Peters, 1878, Monatsb. Akad. Wiss. Berlin, p. 200: Ndi, Taita, Kenya Colony.

♀ (M. C. Z. 32182) Kibwezi, K. C. 27. iii. 34.

3 ♂ 1 ♀ (M. C. Z. 32113-4, 32180-1) Voi, K. C. 11. iv. 34.

♂ (M. C. Z. 32115) Peccatoni, K. C. 24. v. 34.

♀ (M. C. Z. 32179) Ngatana, K. C. 13. vi. 34.

3 ♂ (M. C. Z. 32120-1, 32178) Malindi, K. C. 29. vi. 34.

Native name. The Wapokomo only apply the Kiswahili *panya* to this gerbil; the Wasagalla and Wataita do not differentiate it from the last species.

Discussion. The adults agree in having the long tail black on its upper surface to the very tip, with only a slight admixture of paler buffy hairs towards the base. They differ from *vicina* in the much shorter hairs of the terminal tail tuft, and in the larger hind foot (36-43 mm.). The color of the face differs in being duller, a mixed grayish instead of clear bright buff in the paler areas. The character of the tail tuft in the young of both species is like that of the respective adults.

Measurements. ♂. (Voi) 160. 181. 34. 20 mm., ♀. (Ngatana) 160. 182. 40. 22 mm.

Breeding. Two of the Malindi series are juvenile, measuring 85. 101. 31. 15 mm.

Dict. The Kibwezi gerbil was trapped with cheese, all the others with bread.

TATERA NIGRITA Wroughton

Tatera nigrata Wroughton, 1906, Ann. Mag. Nat. Hist. (7), 17, p. 491: Masindi, Unyoro, Uganda.

♀ (M. C. Z. 31351) Kirui, K. C. 18. i. 34.

♀ (M. C. Z. 31352) Kaimosi, K. C. 9. iii. 34.

Distribution. These records constitute a slight eastward extension of the range which was formerly confined to Uganda.

Native names. *Oonga* (Lugishu); *muragutyet* (Kimasai); *emata* (Kitosh).

Discussion. These two specimens agree in being very much darker above than is usual in East African species of the genus *Tatera*. Their tails are dark above and buffy below, as described by Wroughton. The fore claws are notably long and stout, the skull with broader molars and larger bullae (11–11.5 mm. in length) as compared with those of *T. nigricauda* to which species they otherwise bear a slight resemblance. Although *nigrita* has been described as a small gerbil, our two examples are as large as *T. n. nigricauda*.

Measurements. ♀. (Kirui) 162. 160. 22. 23 mm.

RHIZOMYIDAE

TACHYORYCTES RUDDI Thomas

Tachyoryctes ruddi Thomas, 1909, Ann. Mag. Nat. Hist. (8), 4, p. 546: Kirui, Mount Elgon, Kenya Colony.

8 ♂ 5 ♀ (M. C. Z. 30779–83, 30785–92) Sipi, U. 12–18. xii. 33.

2 ♂ (M. C. Z. 30793, 30801) Kaburomi, U. 28. xii. 33.

1 ♂ (M. C. Z. 30799) Bukori, Kitosh, K. C. 18. i. 34.

4 ♂ 3 ♀ (M. C. Z. 30784, 30794–8, 30800) Kirui, K. C. 20. i. 34.

Native names. *Bumoongwet* (Kisabei); *unungwet* (Kimasai); *ifuko* (Lugishu and Kitosh).

Coloration. One young one is grayish, another black as were all the young ones rejected by Loveridge. This is the normal color of the young according to Hollister (1919, p. 41) as distinct from the brown pelage of the adults, though one adult has remained black.

Measurements. ♂. (Sipi) 215. 64. 28. 10 mm., ♀. (Kirui) 210. 65. 30. 8 mm.

Enemies. The Wanderobo women are expert in handling these big mole rats for they are eaten as a matter of course. They can be picked up by the tail quite safely though to the accompaniment of shrill squeaks. They bite fiercely with their huge teeth at a stick or other object with which they may be restrained.

MURIDAE

DENDROMUS INSIGNIS INSIGNIS Thomas

Dendromus insignis Thomas, 1903, Ann. Mag. Nat. Hist. (7), **12**, p. 341: Nandi, Kenya Colony.

7 ♂ 4 ♀ (M. C. Z. 31211-2, 31214-22) Sipi, U. 13-22. xii. 33.

♀ (M. C. Z. 31208) Butandiga, U. 8. i. 34.

♂ ♀ (M. C. Z. 31174, 31176) Kirui, K. C. 25. i. & 9. ii. 34.

9 ♂ 5 ♀ (M. C. Z. 31181-9, 31193, 31195, 31197-8, 31203) Kaimosi, K. C. 14-20. ii. 34.

Distribution. Hollister (1919, p. 48) has already recorded this very common species of tree mouse from Kaimosi. Though given rank as a distinct species, it seems likely that this striped-back group is more closely related to the South African form.

Native names. *Chapchorogos* (Kisabei); *mandiosi* (Lugishu); *chep-toragopsi* (Kimasai); *mulubendi* (Kitosh); *kisie* (Luragoli); *isorodoni* (Lutereki).

Measurements. ♂. (Sipi) 90. 102. 21. 15 mm., ♀. (Sipi) 90. 104. 22. 15 mm.

Enemies. One was recovered from the stomach of a tree viper (*Atheris squamigera*) at Kaimosi.

DENDROMUS WHYTEI PALLESCENS Osgood

Dendromus whytei pallescens Osgood, 1910, Publ. Field Mus. Nat. Hist., Zoöl. Series, **10**, No. 2, p. 7: Ulukanya Hills, Kenya Colony.

♂ ♀ (M. C. Z. 31223-4) Sipi, U. 14 & 22. xii. 33.

♂ 2 ♀ (M. C. Z. 31210, 31230, 31232) Butandiga, U. 8-14. i. 34.

4 + 1 ♀ (M. C. Z. 31175, 31180, 31225-7) Kirui, K. C. 6-9. ii. 34.

♂ 2 ♀ (M. C. Z. 31196, 31228-9) Kaimosi, K. C. 10 & 20. ii. 34.

Distribution. This is a much smaller species than *D. i. insignis* but occurs alongside it as do also the following species.

Measurements. ♂. (Kaimosi) 77. 90. 18. 12 mm., ♀. (Butandiga) 76. 86. 18. 13 mm.

DENDROMUS RUDDI Wroughton

Dendromus ruddi Wroughton, 1910, Ann. Mag. Nat. Hist. (8), **5**, p. 275: Malakisi, Mount Elgon, Kenya Colony.

2 ♂ 3 ♀ (M. C. Z. 31231, 31234-7) Butandiga, U. 8-14. i. 34.

Type locality. The village of Malakisi is not on Mount Elgon but lies at the southern foot to the west of Bukori. I passed through it

when motoring from Mbale to Bukori as it is on the mainroad skirting the mountain.

Native name. *Tsuru* (Lugishu). The Bagishu distinguish between this unstriped species and the others which display a dorsal line.

Measurements. ♂. 68. 90. 16. 12 mm., ♀. 60. 70. 15. 17 mm.

Enemies. On January 13, three very young unstriped tree mice and seven adult striped *D. acraeus* were brought in alive. As we already had as much skinning to accomplish as we could handle, I put these mice into a large can with quantities of soft grass, bread, and cheese. Later in the evening I heard squeaks proceeding from the tin and on examining them found that all the three young had been killed, and partly devoured, by the adults.

DENDROMUS ACRAEUS Wroughton

Dendromus acraeus Wroughton, 1909, Ann. Mag. Nat. Hist. (8), 4, p. 541: Kirui, Mount Elgon, Kenya Colony.

1 + 5 ♂ 2 ♀ (M. C. Z. 31204-7, 31209, 31233) Butandiga, U. 8-14. i. 34.

3 young (M. C. Z. 31177-9) Kirui, K. C. 9. ii. 34.

5 ♂ 2 ♀ (M. C. Z. 31190-2, 31194, 31199-202) Kaimosi, K. C. 14-20. ii. 34.

Distribution. This species of small size and with an obsolete black median line, seems to be about as common as *D. i. insignis* and occurs in the same localities.

Measurements. ♂. (Kaimosi) 68. 80. 16. 10 mm., ♀. (Kaimosi) 73. 105. 18. 12 mm.

ZELOTOMYS HILDEGARDEAE VINACEUS Heller

Zelotomys hildegardae (sic) *vinaceus* Heller, 1912, Smithsonian Misc. Coll., 59, No. 16, p. 10: Mount Mbololo, Taita Hills, at 3,000 feet, Kenya Colony (amended, see below).

♂ ♀ (M. C. Z. 32086-7) Mt. Mbololo at 3,000 ft., K. C. 24-25. iv. 34.

Type locality. In the original description, this reads: "Ndi, Mount Mbololo." As Ndi is a small railway station on the plains some distance from the foot of the mountain, and an unlikely spot in which to find a rain-forest species, Mr. Heller was communicated with and confirms the supposition that "Mount Mbololo, near Ndi" was intended, as the mountain was so little known at that time.

Discussion. These two topotypes agree precisely with the original description. Their close color resemblance to the local race of *Mastomys* has been remarked upon by Heller and Thomas though the

former states that in life *vinaceus* is distinguishable by the pinkish tint of the paler parts of the tail.

Osgood (1910, p. 7), when erecting the genus, gave the mammary formula as $2 - 2 = 8$, but Thomas (1915, p. 481) found three pairs of pectorals in Congo specimens making $3 - 2 = 10$. One of the above specimens is an adult female with well-developed mammae of which we are able to discover but two pectoral pairs, so that there is probably some variation in this respect.

Nothing was learned of the habits of this interesting animal, which is still rare in collections. The slightly proclivous upper incisors, and rather shortened skull, may indicate that it is somewhat of a burrower.

Measurements. ♂. 130. 105. 23. 16 mm., ♀. 130. 108. 22. 15 mm.

THAMNOMYS SURDASTER POLIONOPS Osgood

Thamnomys surdaster polionops Osgood, 1910, Publ. Field Mus. Nat. Hist., Zool. Series, 10, No. 2, p. 8: Ulukeny Hills, Kenya Colony.

♂ (M. C. Z. 32171) Mt. Mbololo, K. C. 17. iv. 34.

Coloration. This single specimen is a decided shade darker gray, and a trifle less deep in its rusty ochraceous back, than a series from Tanganyika Territory considered as representative of typical *surdaster*. Hollister (1919, p. 58), commenting on a series from Mount Mbololo, regards them as "somewhat intermediate between typical *polionops* and the Kilimanjaro form" but "clearly nearest" to the former.

Measurements. ♂. 122. 170. 26. 15 mm.

Diet. Trapped with bread as a bait at 4,800 feet.

THAMNOMYS SURDASTER ELGONIS Thomas

Thamnomys surdaster elgonis Thomas, 1910, Ann. Mag. Nat. Hist. (8), 5, p. 282: Malakisi, south foot of Mount Elgon, Kenya Colony.

Thamnomys surdaster discolor Thomas, 1910, Ann. Mag. Nat. Hist. (8), 5, p. 283: Kakamega Forest, Kenya Colony.

Thamnomys surdaster insignis Dollman, 1911, Ann. Mag. Nat. Hist. (8), 7, p. 528: south face of Mount Elgon at 9,000 feet, Kenya Colony.

2 ♀ (M. C. Z. 31384-5) Mt. Debasien, U. 22-23. xi. 33.

♂ juv. (M. C. Z. 31213) Sipi, Mt. Elgon, U. 20. xii. 33.

♂ (M. C. Z. 31386) Butandiga, U. 10. i. 34.

♀ (M. C. Z. 31387) Kirui, K. C. 28. i. 34.

♀ (M. C. Z. 31238) Elgonyi, K. C. 5. ii. 34.

♂ ♀ (M. C. Z. 31382-3) Kaimosi, K. C. 19. ii. & 7. iii. 34.

Distribution. The Kirui specimen is almost topotypic of *elgonis*, the Elgonyi of *insignis*, while the pair from Kaimosi are topotypes of *discolor*. We fail to see any reasons, taxonomic or geographic, for keeping them distinct.

Native names. *Araraget* (Kisabei); *sungama* (Lugishu and Kitosh).

Discussion. This thicket mouse of the moist, forested Elgon-Kakamega region is distinguished by the contrasted dark central marking on the metatarsals. In other respects it is very similar to typical *surdaster*, of which it should undoubtedly be considered a local race.

Coloration. The two mice from Mount Debasien, as well as one from Mount Kenya and another from Nyeri in the Museum collection, differ from the rest of the series in wholly lacking any trace of the ochraceous buffy line bounding the white of the underparts from cheeks to ankle. Instead the line of demarcation is abrupt and the sides of the body buffy gray, backs of the feet pale ochraceous buff, and head and shoulders slightly grayer than the back. In skull characters and other respects, however, they show no significant differences from the rest of the series.

Measurements. ♂. (Kirui) 112. 161. 22. 16 mm., ♀. (Butandiga) 125. 172. 23. 17 mm.

Breeding. The very young male (72. 90. 17. 13 mm.) was brought in alive at Sipi on December 20, 1934.

Diet. The Elgonyi mouse was trapped with unripe banana as bait.

OENOMYS BACCHANTE EDITUS Thomas & Wroughton

Oenomys bacchante editus Thomas & Wroughton, 1910, Trans. Zoöl. Soc. London, **19**, p. 509: Mubuku Valley, Mount Ruwenzori, Uganda.

7 ♂ 4 ♀ (M. C. Z. 31626-34, 31650-1) Sipi, U. 13-20. xii. 33.

2 ♂ 2 ♀ (M. C. Z. 31635-8) Butandiga, U. 8-10. i. 34.

5 ♂ 5 ♀ (M. C. Z. 31639-49) Kaimosi, K. C. 10-19. ii. 34.

Native names. *Bunwe* (Lugishu); *indioro* (Luragoli); *nangeti* (Lute-reki).

Coloration. This large series from Mount Elgon and Kakamega is referred to *editus*, following Hollister's (1919, p. 64) determination of those from the latter region in the United States National Museum. As was the case with his series, there is much individual variation in the depth and extent of the rufous areas. Two of the Butandiga rats have the outer and inner sides of the ears deep bright rufous, others from the same locality are dark-eared. An extreme variant from Mount Elgon has the whole of the posterior half of the back tinged with rufous.

Measurements. ♂. (Kaimosi) 180. 200. 30. 20 mm., ♀. (Kaimosi) 175. 185. 30. 20 mm.

Enemies. At Kaimosi, where rusty-nosed rats were very abundant, they were recovered from the stomachs of the following animals and reptiles: Civet (*Civettictis c. schwarzi*), genet (*Genetta s. stuhlmanni*), tree civet (*Nandinia b. arborea*), mongoose (*Herpestes i. funestus*), mamba (*Dendraspis jamesoni*) and nose-horned viper (*Bitis nasicornis*).

RATTUS RATTUS KIJABIUS (Allen)

Mus kijabius J. A. Allen, 1909, Bull. Amer. Mus. Nat. Hist., **36**, p. 169: Kijabe, Kenya Colony.

- ♂ juv. (M. C. Z. 31336) Mt. Debasien, U. 18. xi. 33.
 2 ♂ 2 ♀ (M. C. Z. 31332-5) Sipi, U. 12. xii. 33.
 ♂ 2 ♀ (M. C. Z. 31337-9) Elgonyi, K. C. 24. i. 34.
 ♂ (M. C. Z. 32177) Golbanti, K. C. 23. vi. 34.

Distribution. As Hollister (1919, p. 68) has pointed out, this house rat differs from the race inhabiting the southern United States and the Mediterranean region. It may prove to be a native variety or possibly have been introduced.

Native names. *Miri* (Karamojong); *mabaja* (Lugishu); *gummabat* (Kisabei); *mabageet* (Kimasai); *kimbeba* (Kitosh); *hijunga* (Luragoli); *lichungu* (Lutereki); *ndebe* (Kitaita); *panya* (Kipokomo and Kiswahili).

Coloration. Typically this is a dark, slaty-bellied rat with a dark gray back, not much mixed with brown. The male from Golbanti, Tana River, however, is pure white below to the roots of the hairs. In this respect it corresponds to the rural form of house rats in parts of Asia where the slaty-bellied forms are usually found about towns.

Measurements. ♂. (Sipi) 188. 206. 31. 23 mm., ♀. (Sipi) 180. 192. 30. 22 mm.

Breeding. This large Sipi female held nine big embryos on December 12, 1933.

Diet. The Debasien rat was trapped with meat bait in the tent after it had disturbed me several times by knocking things over. According to the Maragoli, when these rats arrived in the Kakamega country they drove out the dormice (*Claviglis saturatus*) which were formerly very common there.

Enemies. A very big rat, measuring seven and a half inches from snout to anus, was recovered from the stomach of a thirty-two inch House Snake (*Boaedon lineatus*) at Kaimosi, a smaller rat was taken

from a second House Snake in the same locality and a big one from a Puff Adder (*Bitis arietans*) at Bukori.

Habitat. In corroboration of the authors' views given above, it is interesting to note that the white-bellied rat was taken in the rice fields situated some distance from the village of Golbanti.

AETHOMYS KAISERI MEDICATUS (Wroughton)

Mus medicatus Wroughton, 1909, Ann. Mag. Nat. Hist. (8), 4, p. 540: Mumias, Kenya Colony.

1 + ♂ ♀ (M. C. Z. 31340-1, 31353) Mt. Debasien, U. 14-29. xi. 33.

Distribution. Hollister (1919, p. 71) has recorded many examples of this subspecies from Uganda as well as from the Kakamega region.

Native name. *Lonang* (Karamojong).

Coloration. Two of the series are immature, the adult female agrees in its buffy sides and mixed buffy-and-black middorsal area with skins of this race from the Guaso Nyiro country.

Measurements. ♂ imm. 125. 121. 21. 19 mm., ♀. 160. 130+. 30. 21 mm.

Dict. The male was taken in a trap baited with mealie porridge.

PRAOMYS TULLBERGI JACKSONI (de Winton)

Mus jacksoni de Winton, 1897, Ann. Mag. Nat. Hist. (6), 20, p. 318: Entebbe, Uganda.

5 ♂ 5 ♀ (M. C. Z. 31389-93, 31415, 31476-9) Sipi, U. 14-20. xii. 33.
♀ (M. C. Z. 31394) Butandiga, U. 12. i. 34.

2 ♂ 2 ♀ (M. C. Z. 31396-9) Elgoni, K. C. 5-7. ii. 34.
♂ (M. C. Z. 31388) Kirui, K. C. 25. i. 34.
♀ (M. C. Z. 31395) Kaimosi, K. C. 25. ii. 34.

Native names. *Morong* (Kisabei); *changwaset* (Kimasai); *imbagula* (Lugishu); *isakula* (Lutereki).

Coloration. There is more or less individual variation in the amount of russet in the pelage, which seems to increase with age till in some specimens it is nearly clear rufous about the base of the tail.

Measurements. ♂. 130. 145. 25. 21 mm., ♀. 130. 143. 25. 20 mm. Both these rats were from Elgoni; at Sipi they averaged much smaller, viz. ♂. 120. 126. 24. 20 mm., ♀. 122. 135. 25. 18 mm., even so this male was much larger than the general run of males taken at Sipi.

Dict. Trapped with banana at Elgoni as related under *Claviglis saturatus*; with a cheese bait in my tent at Kaimosi.

Enemies. At Kaimosi one was recovered from the stomach of a mongoose (*Herpestes i. funestus*), another from a tree viper (*Atheris squamigera*) on February 24, 1934.

Habitat. So abundant was this species in the forest surrounding the clearing where I camped above Sipi, that we took nine in ten traps put out the first night of trapping.

PRAOMYS TAITAE (Heller)

Epimys taitae Heller, 1912, Smithsonian Misc. Coll., **59**, No. 16, p. 9: Mount Mbololo, Taita Hills, Kenya Colony.

♂ 2 ♀ (M. C. Z. 32131, 32124-5) Mt. Mbololo, K. C. 18. iv. 34.

Distribution. As this rat has only been taken from the Taita Hills it may have rather a restricted range.

Discussion. This species seems to be quite distinct from the larger *P. tullbergi* and its races. *P. taitae* has a smaller body and feet and a much shorter skull in which the line of supraorbital beading is present as a barely indicated ridge.

Measurements. ♂ juv. 62. 48. 17. 10 mm., ♀ ad. 95. 120. 22. 18 mm.

Breeding. This female and her two young were dug from among loose mold and dead leaves which had drifted between the huge buttress roots of a giant tree at the lower edge of the forest at about 4,000 feet.

MASTOMYS COUCHA TINCTUS (Hollister)

Rattus coucha tinctus Hollister, 1918, Smithsonian Misc. Coll., **66**, No. 10, p. 1: Kaimosi, Kenya Colony.

3 ♂ 7 ♀ (M. C. Z. 31400-9) Mt. Debasien, U. 20-29. xi. 33.

♂ juv. (M. C. Z. 31780) Greeki River, U. 7. xii. 33.

♀ (M. C. Z. 31414) Kirui, K. C. 1. ii. 34.

4 ♀ (M. C. Z. 31410-3) Kaimosi, K. C. 20. ii-8. iii. 34.

Native names. *Loyokomur* (Karamojong); *ikaria* (Lugishu).

Coloration. Hollister (1919, p. 89) defines this as a large race of dark tint whose underparts are only slightly paler than its sides. Most of the series listed above are not fully adult but the hair of their bellies, though with the usual gray bases, is rather contrastingly white-tipped. The rats forming the Mount Debasien series are also mostly subadult, but scarcely differ from the Kaimosi topotypes, though possibly a very little paler grayish above.

Measurements. ♂. (Debasien) 130. 108. 23. 19 mm., ♀. (Kaimosi) 130. 112. 22. 18 mm.

Breeding. The male from Greeki River, December 7, 1933, was one of four young (83. 80. 22. 17 mm.) trapped the same day but damaged by ants.

Enemies. One was recovered from the stomach of a tree viper (*Atheris squamigera*) at Kaimosi on February 21, 1934.

MASTOMYS COUCHA HILDEBRANDTHI (Peters)

Mus hildebrandtii Peters, 1878, Monatsb. Akad. Wiss. Berlin, p. 200: Ndi, Taita, Kenya Colony.

♂ (M. C. Z. 32189) Kibwezi, K. C. 27. iii. 34.

♂ ♂ (M. C. Z. 32130, 32183) Peccatoni, K. C. 25. v. 34.

♂ 5 ♀ (M. C. Z. 32126-28, 32184-5, 32187) Ngatana, K. C. 12-19. vi. 34.

♀ ♀ (M. C. Z. 32186, 32129) Golbanti, K. C. 23. vi. 34.

♂ (M. C. Z. 32189) Malindi, K. C. 30. vi. 34.

Distribution. The specimens from the Tana region are probably best referred to *hildebrandtii*. The immatures are less blue gray than are rats from near Mombasa which represent the race *durumae*.

Native name. *Panya* (Kipokomo, who do not appear to have specific names for rodents).

Measurements. ♂. (Malindi) 155. 182. 31. 21 mm., ♀. (Ngatana) 138. 122. 22. 17 mm.

Breeding. At Golbanti, June 23, 1934, a female, which had sixteen breasts in milk, together with her thirteen young (68. 60. 19. 13 mm.) was dug from a nest of grass situated about a foot beneath the surface, in clay, at the edge of a rice field. The sedges, which formerly covered the site of the nest, had been cut down and spread over the ground like a carpet. In addition to two entrances to the nest there were a number of blind alleys, some of which were probably for drainage purposes.

Enemies. Two in the stomach of a serval (*Felis c. hindei*) near Golbanti.

Parasites. Mites were numerous on the mother.

LEGGADA TRITON TRITON Thomas

Leggada triton triton Thomas, 1909, Ann. Mag. Nat. Hist. (8), 4, p. 548: Kirui, Mount Elgon, Kenya Colony.

3 ♂ 11 ♀ 5 young (M. C. Z. 31482, 31498, 31530-6, 31552-61)
Sipi, U. 14-22. xii. 33.

3 ♂ 10 ♀ (M. C. Z. 31537-47, 31550-1) Butandiga, U. 8-13. i. 34.
1 (M. C. Z. 31515) Kirui, K. C. 6. ii. 34.

7 ♂ 4 ♀ (M. C. Z. 31548-9, 31562-70) Kaimosi, K. C. 9-21. ii. 34.

Distribution. Occurring alongside *L. g. grata* in all these localities, where both species are abundant. The topotype is without sex or measurements as it was obtained by a skinner, who could neither read nor write, who was sent to Kirui to ask for it specifically by its native name.

Native names. *Chepehom* (Kisabei); *mbuhu* (Lugishu); *kivudu* (Luragoli); *shivudu* (Lutereki).

Measurements. ♂. (Kaimosi) 85. 54. 15. 12 mm., ♀. (Kaimosi) 85. 55. 14. 12 mm.

Breeding. At Sipi, on December 20, 1933, three nestling young were brought in, on the 22nd another.

Enemies. At Butandiga a female had a truncated tail, healed, though half was missing. One of these pygmy mice was recovered from the stomach of a house snake (*Boaedon lineatus*).

LEGGADA BELLA BELLA Thomas

Leggada bella Thomas, 1910, Ann. Mag. Nat. Hist. (8), 5, p. 87: Machakos, Kenya Colony.

3 (M. C. Z. 31512-4) Kirui, K. C. 6. ii. 34.

Distribution. This white-bellied pygmy mouse was apparently far less common in the Elgon region than the other two species, *triton* and *grata*. These three were obtained by Loveridge's skinner under the conditions mentioned above.

LEGGADA BELLA VICINA Thomas

Leggada bella vicina Thomas, 1910, Ann. Mag. Nat. Hist. (8), 5, p. 88: Takaungu, near Mombasa, Kenya Colony.

♂ ♀ (M. C. Z. 32190-1) Kitau, Manda Id., K. C. 16 & 18. v. 34.

Distribution. Said to occur in houses at Lamu, Lamu Island, though Loveridge failed to obtain any during the week that he was there.

Measurements. ♂. 57. 40. 11. 8 mm., ♀. 54. 48. 11. 10 mm.

Habitat. Captured in a ruined hut.

LEGGADA GRATA GRATA Thomas

Leggada grata Thomas, 1909, Ann. Mag. Nat. Hist. (8), 4, p. 549: Mubuku Valley, Mount Ruwenzori, Uganda.

5 ♂ 9 ♀ 3 young (M. C. Z. 31481, 31483-97, 32192) Sipi, U. 19-22. xii. 33.

5 ♂ 2 ♀ (M. C. Z. 31499-505) Butandiga, U. 8. i. 34.

4 + 2 ♀ (M. C. Z. 31506-511) Kirui, K. C. 1-6. ii. 34.

♀ (M. C. Z. 31517) Elgoni, K. C. 4. ii. 34.

2 ♂ 10 ♀ (M. C. Z. 31518-29) Kaimosi, K. C. 9-20. ii. 34.

Native names. *Limwani* (Luragoli); *sinamutali* (Lutereki).

Coloration. This is a small grayish species with a buffy line separating the dorsal coloring from the white of the belly.

Measurements. ♂. (Butandiga) 70. 55. 13. 10 mm., ♀. (Sipi) 72. 54. 12. 10 mm.

Breeding. At Butandiga, on January 8, 1934, a female, measuring 62. 52. 13. 10 mm., held three fetuses, measuring ♀. 41. 16. 8. and ear ? mm.

Enemies. At Kaimosi one of these pygmy mice was recovered from the stomach of an European Kestrel (*Falco t. tinnunculus*), two from House Snakes (*Boaedon lineatus*) and one from a tree viper (*Atheris squamigera*).

A Sipi male had no external trace of a right hind limb though within the apparently uninjured skin it was present to the knee; the condition would appear therefore to have been congenital rather than resulting from an attack. Despite this handicap the little animal was in good condition. Living must be particularly favourable for this species at Sipi, despite the great variety of larger rodents occurring there, for natives brought in twice the number preserved during the first week of my stay.

CRICETOMYS GAMBIANUS ELGONIS Thomas

Cricetomys gambianus elgonis Thomas, 1910, Ann. Mag. Nat. Hist. (8), 5, p. 198: South face of Mount Elgon at 10,000 feet, Kenya Colony.

2 ♂ 1 ♀ (M. C. Z. 32219-21) Sipi, U. 18-22. xii. 33.

1 ♂ 1 ♀ (M. C. Z. 32222-3) Kirui, K. C. 25. i. 34.

6 ♂ 2 ♀ (M. C. Z. 32212-8, 32224) Elgonyi, K. C. 28. i-3. ii. 34.

6 ♂ 4 ♀ (M. C. Z. 32225-32, 32261-2) Kaimosi, K. C. 14-21. ii. 34.

Distribution. I was also shown one at Kaburomi, 10,500 feet, in the alpine zone, which rat was said to have been killed locally. The fact that it was decomposed, however, raises the possibility that it had been brought up the mountain from Sipi.

Native names. *Keraing* (Kisabei); *livunzi* (Lugishu); *evunge* (Kitosh); *unget* (Kimasai); *kikomi* (Luragoli); *shekome* (Lutereki).

Measurements. ♂. (Kaimosi) 400. 440. 70. 46 mm., ♀. (Kirui) 380. 405. 67. 45 mm.

Breeding. At Kaimosi, on February 14, 1934, an embryo measuring 100. 35. 19. 12 mm., was preserved. The following day a native brought in two naked nestlings of which the male measured 115. 55. 22. 10 mm.

Diet. The Bagishu aver that the giant rat only eats grass. I checked and rechecked this statement as it is in direct contradiction to what the Wakami told me respecting the race (*C. g. osgoodi*) inhabiting the Uluguru Mountains (cf. Allen & Loveridge, 1927, p. 436).

Parasites. Two species of orthopteran parasites (*Hemimerus hansenii* & *H. talpoides*) were collected in their fur at Sipi, the former only at Kirui and Kaimosi. The rats were dirty at Sipi but in fine clean condition at Kaimosi despite the numerous *Hemimerus*.

Enemies. The bodies of these giant rats were esteemed a delicacy and greatly in demand by the Wasabei, Bagishu, Elgon Masai, and Watereki all of whom trap them with deadfalls as a regular thing. One frequently met with the traps in the forest.

Folklore. The Maragoli say that when a male is killed all the females in the vicinity will die.

LOPHUROMYS AQUILUS AQUILUS (True)

Mus aquilus True, 1892, Proc. U. S. Nat. Mus., **15**, p. 460: Mount Kilimanjaro, Tanganyika Territory.

Lophuromys rubecula Dollman, 1909, Ann. Mag. Nat. Hist. (8), **4**, p. 551: Elgonyi, Mount Elgon, Kenya Colony.

16 (M. C. Z. 31447-62) Sipi, U. 12-13. xii. 33.

♂ 4 ♀ (M. C. Z. 31441-5) Butandiga, U. 8-13. i. 34.

♀ (M. C. Z. 31473) Goletatomi, K. C. 31. i. 34.

3 ♂ 6 ♀ (M. C. Z. 31464-72) Kaimosi, K. C. 10-19. ii. 34.

Distribution. This harsh-furred mouse also occurs in the alpine zone at Kaburomi, 10,500 feet, where I rejected a damaged specimen. The species did not occur at Elgonyi where I was camped so that it appears probable that Kemp obtained the type of *rubecula* rather higher than my camp. I sent natives up a day's march above Elgonyi and they secured one at a place they called Goletatomi, which is topotypic of *rubecula*.

Native names. *Jamasiku* (Kisabei); *siku* (Lugishu); *chemasoget* (Kimasai); *lidulu* (Luragoli); *liguwe* (Lutereki).

Coloration. The wide individual differences in intensity of coloring on the underside, as well as those due to season, nullify any attempt to break up this species into races on such grounds since intergradation occurs between extreme types. The extremes in the case of the ventral surface are a pinkish buff on the one hand and a bright vinaceous on the other.

We therefore concur with Hollister (1919, p. 110) that there are

insufficient grounds for considering *rubecula* of Mount Elgon as racially distinct from *aquilus* of Mount Kilimanjaro.

Measurements. ♂. (Kaimosi) 125. 75. 20. 16 mm., ♀. (Kaimosi) 143. 75. 21. 18 mm.

Enemies. A mouse, apparently referable to this species, was found in the stomach of a nose-horned viper (*Bitis nasicornis*).

LOPHUROMYS SIKAPUSI ANSORGEI de Winton

Lophuromys ansorgei de Winton, 1896, Proc. Zool. Soc. London, p. 607: Mumias, Kenya Colony.

♂ ♂ (M. C. Z. 31446, 31463) Sipi, U. 12-13. xii. 33.

Discussion. Judging from the fact that only two of these mice were obtained at Sipi, it would appear that it is much less common there, or has a more restricted habitat, than *L. a. aquilus*. There can be little doubt that this is an eastern representative of *L. sikapusi* of the clearings and forest edges of West Africa. We are therefore regarding its status as that of a subspecies.

Coloration. As compared with *L. a. aquilus*, the pelage of *ansorgei* is of more even coloring, a paler olive brown and lacking the minute ticking while the belly is of a clearer chestnut tint.

Measurement. ♂. 101. 54. 20. 16 mm.

SACCOSTOMUS CRICETULUS sp. nov.

Type. Museum of Comparative Zoölogy, No. 31, 475. A subadult male, skin and skull, from the south bank of Greeki River, Sabei district, due north of Mount Elgon, Uganda, collected by Arthur Loveridge, December 5, 1933.

Description. In color this is a much darker gray than neighboring members of the genus, with almost none of the buffy tints of back and sides. Dorsal surface of the body from the muzzle to the root of the tail, a uniform "deep mouse gray" to "dusky drab" of Ridgway, becoming faintly tinged along the sides and cheeks with "pale ochraceous buff." The individual hairs of the back are of a "deep neutral gray" basally, this color gradually passing into a narrow subterminal band of very pale buffy (under a lens appearing soiled whitish), succeeded by a black tip. The ears on both inner and outer surfaces are a uniform dark blackish brown, slightly contrasting with the surrounding dark gray of the head, and conspicuously edged with clear white. Dorsal surface of the tail like the back, becoming slightly paler below with the admixture of short whitish hairs among the

black. Backs of the hands and feet white as far as the wrists and ankles. Below, the hair of the chin is whitish to the roots; elsewhere that of the entire under surface of the body, and of the legs to the wrists and ankles is "deep neutral gray" at base, tipped with whitish, the gray bases everywhere showing through conspicuously, giving an effect of dark grayish tinted with bluish.

The skull does not differ noticeably from that of *Saccostomus isiolae* Heller, its eastern neighbor of the dry Guaso Nyiro country. The nasals equal or minutely exceed the posterior extension of the premaxillae as in the latter, and in the coastal *mearnsi* Heller (type from Changamwe, Kenya Colony), instead of conspicuously exceeding them as in *umbriventer* Miller of the Sotik region to the southward. Of these closely related forms, the molar teeth are smallest and the molar rows nearly parallel in the last-named but in the others and in *cricetulus* the teeth are slightly heavier, while the divergence of the rows is most noticeable in the new animal. The supraorbital ridges are most prominent in *umbriventer*, less so in the others. The posterior palatal pits are of about the same size in all, except that in the type specimen of *mearnsi* they are unusually large.

Measurements. In external measurements this pouched mouse does not apparently differ from the neighboring forms. The collector's measurements are as follows, those of the male type (No. 31475) preceding those of the female paratype (No. 31474):—head and body, 133, 133 mm.; tail, 50, 55 mm.; hind foot, 20, 22 mm.; ear 20, 21 mm.

The skull of the type and that of the paratype are slightly damaged at the posterior end, but that of the former shows the following:—greatest length, 30 mm.; palatal length, 18.7; zygomatic width, 16.6; width of brain case above squamosal roots, 13.7; interorbital width, 4.5; length of nasals, 13.0; upper molar row, 6.7; width across molar rows anteriorly, 7.7; same posteriorly, 6.5; lower molar row, 6.6.

Remarks. The trapping of these two specimens extends the known range of the genus slightly to the northwestward. In their uniformly dark gray coloring and conspicuous white edges of the ears they differ strikingly from the neighboring forms of the genus, while the shortened tail and white feet further combine to give them a close external likeness to the larger Asiatic species of *Cricetulus*, which has suggested the specific name. They were captured in the usual type of habitat for the genus, namely open grass- and bush-covered country, and in this case near the banks of a river.

Through the kindness of Mr. Gerrit S. Miller, Jr., and Dr. Reming-

ton Kellogg, of the U. S. National Museum, we have had for comparison the type and a topotype of the form *mearnsi* Heller and most of the original series of *umbriventer* Miller, which, with a series of topotypical *isiolae* Heller from Guaso Nyiro country, have served as a basis for comparison. These three were described as separate species, but externally are all practically identical and are without doubt very closely related. In cranial characters, however, *umbriventer* (which seems to be hardly, if any, darker underneath than the two others) is perhaps distinguishable on the basis of its slightly weaker molar teeth and the nearly parallel alignment of the molar rows, as well as by the relatively longer nasals, exceeding the premaxillaries posteriorly, and the narrower interorbital space with somewhat more prominent supraorbital ridges. These characters are at best of no more than subspecific value, and all three, if recognizable at all, are subspecifically related. Hollister (1919, p. 114) in reviewing the East African forms has already suggested this, but did not attempt to say of what species they should be considered races.

The South African *S. mashonae* is said to be at once distinguishable by the well-developed antero-external cusp of the second upper molar, which in these more northern forms is extremely small; moreover, *S. campestris*, of which these might be thought races, is at once distinguished by the pure white belly, the hairs without dark bases. In the absence of specimens from intermediate localities, it seems best at present to regard the Kenya Colony *Saccostomus* as a separate species (*mearnsi*) of three described races, while the form here named is so different in its coloration, that its subspecific relation to them is doubtful, and we have provisionally given it specific rank.

ACOMYS IGNITUS IGNITUS Dollman

Acomys ignitus Dollman, 1910, Ann. Mag. Nat. Hist. (8), 6, p. 229; Voi, Kenya Colony.

♂ ♂ (M. C. Z. 32107-8) Tsavo, K. C. 31. iii. & 4. iv. 34.

♂ ♀ (M. C. Z. 32106, 32110) Voi, K. C. 7. iv. 34.

♂ (M. C. Z. 32109) Kitau, Manda Id., K. C. 15. v. 34.

Coloration. The three spiny mice from Tsavo and Voi differ slightly amongst themselves, the topotype from Voi being an intense rusty on the sides while the two from Tsavo are a clear, rich ochraceous. The Manda Island animal is slightly paler with its dull dorsal area more extensive, a difference which is probably due in part to immaturity.

Measurements. ♂. (Tsavo) 120. 88. 15. 15 mm., ♀. 100. 72. 16. 16 mm.

Breeding. At Voi, on April 7, 1934, a very young male (68. 45. 11. 12 mm.) was taken.

Enemies. At Voi one was recovered from the stomach of a Lizard-Buzzard (*Kaupifalco m. monogrammicus*).

Habits. One of the Tsavo specimens was taken in a rat trap between 6 and 9 a.m., if the trapper can be believed, for he averred that he examined the trap at 6 a.m. daybreak. The abdominal fur had slipped already when found at 9 a.m., the weather was extremely hot and the trap exposed to the sun's rays.

ACOMYS WILSONI WILSONI Thomas

Acomys wilsoni Thomas, 1892, Ann. Mag. Nat. Hist. (6), 10, p. 22: Mombasa, Kenya Colony.

♂ ♀ (M. C. Z. 32111-2) Wema, Ngatana, K. C. 12 & 19. vi. 34.

Native name. *Mgonachekede* (Kipokomo).

Coloration. These two skins represent the brighter-colored coastal race of this small short-tailed spiny mouse.

Measurements. ♂. 87. 45. 12. 11 mm., ♀. 75. 50. 12. 12 mm.

DASYMYS HELUKUS HELUKUS Heller

Dasymys helukus Heller, 1910, Smithsonian Misc. Coll., 54, No. 1924, p. 2: Sirgoit, Uasin Gishu Plateau, Kenya Colony.

♀ (M. C. Z. 31357) Butandiga, U. 8. i. 34.

♂ ♀ (M. C. Z. 31354-5) Kirui, K. C. 1. ii. 34.

4 ♂ 5 ♀ (M. C. Z. 31356, 31358-65) Kaimosi, K. C. 8-22. ii. 34.

Native names. *Bunwe* (Lugishu); *inya* (Luragoli and Lutereki).

Coloration. These swamp rats form a uniformly dark, shaggy-haired series with the exception of one of the Kirui specimens which is decidedly more tawny or olive brown.

Measurements. ♂. (Kirui) 180. 142. 29. 20 mm., ♀. (Kaimosi) 165. 137. 30. 24 mm.

Parasites. Numerous fleas and mites preserved from the fur of a Kaimosi rat.

Enemies. One was recovered from the stomach of a wild cat (*Felis o. nandae*) at Kaimosi.

PELOMYS FALLAX IRIDESCENS Heller

Pelomys fallax iridescent Heller, 1912, Smithsonian Misc. Coll., 59, No. 16, p. 12: Mount Mbololo, Taita, Kenya Colony.

♀ (M. C. Z. 32123) Mt. Mbololo, K. C. 26. iv. 34.

Distribution. This is one of the mammals that Loveridge hoped to obtain in his brief visit to the type locality, but only trapped a single specimen. According to Hollister (1919, p. 125) it was abundant at the time of Heller's visit for the latter secured no less than thirty-seven.

Measurements. ♀. 130. 115. 29. ? ear. mm.

ARVICANTHIS ABYSSINICUS NUBILANS Wroughton

Arvicanthis abyssinicus nubilans 1909, Ann. Mag. Nat. Hist. (8), 4, p. 539: Kisumu, 3,600 feet, Kenya Colony.

5 ♂ 4 ♀ (M. C. Z. 31342-50) Sipi, U. 12-19. xii. 33.

6 ♂ 4 ♀ (M. C. Z. 31296-9, 31310-5) Butandiga, U. 8. i. 34.

5 ♂ 5 ♀ (M. C. Z. 31291-2, 31316-23) Kirui, K. C. 22-23. i. 34.

5 ♂ 6 ♀ (M. C. Z. 31293-5, 31324-31) Kaimosi, K. C. 10-14. ii. 34.

Native names. *Myera* (Kisabei, Lugishu and Kitosh); *manyaret* (Kimasai); *engeki* (Luragoli); *injhi* (Lutereki).

Measurements. ♂. (Kaimosi) 165. 130. 29. 18 mm., ♀. (Kirui) 161. 122. 27. 18 mm.

Enemies. Recovered from the stomachs of a Crested Eagle (*Lophætus occipitalis*), mongoose (*Herpestes i. funestus*), Hissing Sand Snake (*Psammodphis sibilans*) and Black-lipped Cobra (*Naja melanoleuca*), at Butandiga and Kaimosi.

ARVICANTHIS ABYSSINICUS VIRESCENS Heller

Arvicanthis abyssinicus virescens Heller, Smithsonian Misc. Coll., 63, No. 7, p. 11: Voi, Kenya Colony.

♂ (M. C. Z. 32207) Golbanti, K. C. 22. vi. 34.

Discussion. This specimen is referred to the coastal race which, however, is not very different from its neighbors farther inland.

Measurements. ♂. 150. 136. 30. 18 mm.

Dict. Trapped with bread as a bait.

Note. Very small ants cut the hairs from the rump of this rat as it lay dead in the trap.

LEMNISCOMYS GRISELDA MACULOSUS (Osgood)

Arvicanthis dorsalis maculosus Osgood, 1910, Publ. Field Mus. Nat. Hist., Zool. Series, 10, p. 17: Voi, Kenya Colony.

♂ (M. C. Z. 32122) Wema, Ngatana, K. C. 15. vi. 34.

Distribution. This seems to be an uncommon species on the coast of Kenya Colony though abundant enough in the Voi-Taita region.

Native name. *Kadzora* (Kipokomo).

Measurements. ♂. 130. 132. 26. 18 mm.

Breeding. Striped Grass Rats were breeding at Wema in June for about a score of nestlings, averaging 57. 32. 14. 7 mm., were brought in from the village of Wema, Tana River.

LEMNISCOMYS STRIATUS MASSAICUS (Pagenstecher)

Mus (Lemniscomys) barbarus L. var. *massaicus* Pagenstecher, 1885, Jahrb. Wiss. Anstalt, Hamburg, 2, p. 45: Lake Naivasha, Kenya Colony.

1 + 3 ♂ 2 ♀ (M. C. Z. 31687-92) Mt. Debasien, U. 21-29. xi. 33.

♂ (M. C. Z. 31664) Sabei, U. 9. xii. 33.

3 ♂ 5 ♀ (M. C. Z. 31652-9) Sipi, U. 12-20. xii. 33.

2 ♂ 2 ♀ (M. C. Z. 31660-3) Butandiga, U. 8. i. 34.

7 ♂ 4 ♀ (M. C. Z. 31676-86) Kirui, K. C. 22. i-1. ii. 34.

2 ♀ (M. C. Z. 31665-6) Elgonyi, K. C. 4. ii. 34.

4 ♂ 5 ♀ (M. C. Z. 31667-75) Kaimosi, K. C. 8-19. ii. 34.

Distribution. Another was trapped on the south bank of the Greeki River but the sun was so hot that the fur had slipped when it was brought in at 4 p.m. This species, so common in the Mount Elgon region, is an upland form apparently absent from the coast.

Native names. *Kimwarees* (Kisabei); *oluvende* (Lugishu); *aluvende* (Kitosh); *chemotet* (Kimasai); *livende* (Luragoli and Lutereki).

Measurements. ♂. (Sabei and Sipi) 136. 141. 25. 16 mm., ♀. (Sipi) 131. 133. 25. 16 mm.

Parasites. Nymphal ticks (*Ixodes* sp.) were common on these rats at Mount Debasien.

Enemies. One was recovered from the stomach of a White Nile Chanting Hawk (*Meliërax m. metabates*) on Debasien.

RHABDOMYS PUMILIO DIMINUTUS (Thomas)

Isomys pumilio diminutus Thomas, 1892, Proc. Zool. Soc. London, p. 551: Mianzini, east of Lake Naivasha, Kenya Colony.

♀ (M. C. Z. 31693) Madangi, U. 3. i. 34.

Distribution. This striped grass rat was only encountered in the alpine zone of Mount Elgon where it was common enough at 12,000 feet.

Native name. *Oluvende* (Lugishu).

Measurements. ♀. 125. 88. 21. 14 mm.

OTOMYS TROPICALIS ELGONIS Wroughton

Otomys irroratus elgonis Wroughton, 1910, Ann. Mag. Nat. Hist. (8), 5, p. 207:
Elgonyi, Mount Elgon, Kenya Colony.

7 ♂ 8 ♀ (M. C. Z. 31269-72, 31377-81, 31426-31) Sipi, U. 13-16. xii. 33.

1 (M. C. Z. 31371) Kaburomi, U. 28. xii. 33.

♀ (M. C. Z. 31376) Madangi, U. 3. i. 34.

♂ (M. C. Z. 31373-4) Butandiga, U. 8. i. 34.

6 ♂ 3 ♀ (M. C. Z. 31375, 31416, 31418, 31420, 31432-4, 31436, 31439)

. Kaimosi, K. C. 8-14. ii. 34.

Native names. *Urusti* (Kisabei); *mbole* (Lugishu); *ivole* (Luragoli); *livole* (Lutereki).

Measurements. ♂. (Sipi) 180. 85. 28. 23 mm., ♀. (Kaimosi) 182. 86. 26. 22 mm.

Breeding. At Sipi, on December 20, 1933, a native brought in a female suckling her two young. When I lifted her out of the gourd she made no attempt to escape and the young, though quite large, remained attached to the mother's teats as she was transferred to the ground to be photographed. Afterwards I removed the family to the 'bush' and let them go. At Butandiga, on January 8, 1934, a suckling male, measuring 83. 40. 21. 13 mm., was brought in. At Kaimosi, on February 15, 1934, a female was suckling two young.

Enemies. Elgon swamp rats were recovered from the stomachs of a variety of creatures at Kaimosi, namely a genet (*Genetta s. stuhlmanni*), tree civet (*Nandinia b. arborea*), mongooses (*Herpestes i. funestus* and *Ichneumia a. ibeana*), twice from wild cats (*Felis o. nandae*), and a mamba (*Dendraspis jamesoni*).

OTOMYS ANGONIENSIS ELASSODON Osgood

Otomys angoniensis elassodon Osgood, 1910, Publ. Field Mus. Nat. Hist., Zoöl. Series, 10, p. 10: Naivasha, Kenya Colony.

5 ♂ 5 ♀ (M. C. Z. 31368-70, 31372, 31421-5, 31438) Kaburomi, U. 28. xii. 33.

2 ♀ (M. C. Z. 31366-7) Goletatomi, K. C. 31. i. 34.

3 ♂ 2 ♀ (M. C. Z. 31417, 31419, 31435, 31437, 31440) Kaimosi, K. C. 8-14. ii. 34.

Native names. *Murusi* (Kisabei, perhaps not different from that recorded above for *O. t. elgonis*); *mburustit* (Kimasai).

Coloration. This is a somewhat grayer looking animal than *O. t. elgonis* and possessing a pale grayish throat and chest. It seems to largely replace *elgonis* in the alpine zone of Mount Elgon but both occur together at Kaimosi where they are perhaps equally common though, strangely enough, Heller obtained seventeen *elgonis* but no *classodon* in this locality.

Measurements. ♂. (Kaimosi) 167. 182. 26. 22 mm., ♀. (Kaimosi) 170. 80. 23. 21 mm.

Enemies. This swamp rat is eaten by the Wanderobo at Kaburomi. Its fur figured largely in the droppings of servals (*Felis c. hindei*) which were very abundant in the alpine-meadow zone of Mount Elgon. One was recovered from the stomach of a buzzard (*Buteo r. augur*) at Kaburomi, another from that of a harrier (*Circus macrourus*) at Kaimosi.

HYSTRICIDAE

HYSTRIX GALEATA Thomas

Hystrix galeata Thomas, 1893, Ann. Mag. Nat. Hist. (6), 11, p. 220: Lamu, Kenya Colony.

♂ (M. C. Z. 32284) Sipi, U. 22. xii. 33.

Native names. *Sabidet* (Kimasai); *esegesi* (Kitosh); *isegesi* (Lugishu and Lutereki); *rungu* (Luragoli); *sasa* (Kitaita).

Discussion. This specimen is immature with only two cheek teeth erupted on each side. It can only tentatively be identified with typical *galeata* rather than with one of the more or less nominal races that have been described from Kenya Colony and Tanganyika Territory in recent years.

Measurements. ♂. 570. 80. 85. 36 mm.

Diet. Its stomach was distended with maize, so finely masticated that I had to rely for its identification on the Bagishu who speared this porcupine.

Enemies. Eaten by the Bagishu and Wasabei.

ATHERURUS TURNERI St. Leger

Atherura turneri St. Leger, 1932, Ann. Mag. Nat. Hist. (10), 10, p. 231: Kaimosi, Kakamega, Kenya Colony.

1 + 5 ♂ 4 ♀ (M. C. Z. 32274-83) Kaimosi, K. C. 8-11. ii. 34.

Native names. *Kahegenya* (Luragoli); *shihekenye* (Lutereki).

Discussion. This fine series of topotypes presents a fairly uniform appearance, with dark blackish-brown spines, pale whitish at the base, and with the tassel of the tail white. Externally they are similar to *A. africana* of western Africa, but the skulls differ conspicuously in almost lacking any sign of inflation of the premaxillary and anterior frontal region. Instead, the rostrum is narrow with a narrow and inconspicuous ascending arm of the premaxillary which hardly appears in dorsal view, whereas in the other species this part of the base of the rostrum is broad with a wide arm of the premaxillary broadly visible in the dorsal aspect of the skull. In addition the frontal region of the Kaimosi animal is much flattened, but swollen and inflated in *africana*.

Evidently *turneri* represents a much more primitive state, and instead of being a race of *africana*, as might have been supposed, may be retained as a distinct species until intermediate forms are found.

Measurements. ♂. 470. 200. 72. 39 mm., ♀. 460. 205. 62. 31 mm.

Diet. The stomachs contained finely gnawed vegetable matter.

Habitat. I often came across holes in the forest near the river. The natives said that these were made by aquatic porcupines, that they lived in them and that they did not climb trees, the latter might be inferred from their build and feet which appear unsuitable for climbing. The Watereki hunt them with dogs and spears.

THRYONOMYIDAE

CHOEROMYS GREGORIANUS (Thomas)

Aulacodus gregorianus Thomas, 1894, Ann. Mag. Nat. Hist. (6), 13, p. 202:
Luiji Reru River, Konu, Kikuyu, Kenya Colony.

♂ juv. (M. C. Z. 31276) Kirui, K. C. 25. i. 34.

2 ♂ ♀ juv. (M. C. Z. 31273-5) Kaimosi, K. C. 9 & 20. ii. 34.

Native names. *Megore* (Kimasai); *esabolet* (Kitosh); *isiavale* (Luragoli and Lutereki).

Discussion. These specimens are very uniform in coloring, but not fully adult, as is shown by the fact that the last molars have not erupted.

Measurements. ♂. 340. 73. 62. 29 mm., ♀. 290. 85. 59. 27 mm.

Remarks. The large cane rat (*T. swinderianus*) also occurs at Kaimosi, several huge ones were offered for sale but were so highly esteemed as food that the hunters would not sell them under five

shillings (\$1.25) each. Nor would they consent to have the skin and skull removed for a shilling and the meat returned to them.

LEPORIDAE

LEPUS VICTORIAE KAKUMEGAE Heller

Lepus kakumegae Heller, 1912, Smithsonian Misc. Coll., **59**, No. 16, p. 19:
Lukosa River, Kakamega Forest, Kenya Colony.

♂ (M. C. Z. 32273) Kirui, K. C. 28. i. 34.

♂ (M. C. Z. 32272) Elgonyi, K. C. 5. ii. 34.

Native names. *Nduyu* (Kitosh); *irangut* (Kimasai); *kifoyo* (Luragoli); *shikalla* (Lutereki).

Coloration. This is a richly colored hare, the extensively black upper side of whose tail was pointed out by Heller as being one of the characters which distinguish it from typical *victoriae*.

Measurements. ♂. (Elgonyi) 480. 75. 110. 90 mm.

Parasites. Fleas and ticks were swarming on the Elgonyi animal.

Habitat. These hares were common enough on the grass-grown hill-sides of southern Elgon as well as in the alpine zone, but so active that I never got a shot at one. Both the animals listed above were snared by natives, and brought in alive, then chloroformed.

SUIDAE

HYLOCHOERUS MEINERTZHAGENI MEINERTZHAGENI Thomas

Hylochoerus meinertzhageni Thomas, 1904, Nature, **70**, p. 577: Nandi Forest, Kenya Colony at 7,000 feet.

Type locality. Mr. F. N. Hoyt of the Friends' Africa Mission at Kaimosi, informs me that the type specimen of this giant forest hog was killed by natives on the mission property just below my camp site, i.e. at Kaimosi. It was given, or sold, by the natives to Mr. A. B. Chilsom, Mr. Hoyt's predecessor, who in turn parted with it to Major Meinertzhagen when the latter was passing through Kaimosi.

The type locality is, therefore, in one sense erroneous. On the other hand the hog undoubtedly came from either the Kakamega or Nandi Forests in the vicinity of Kaimosi.

During my stay at Kaimosi a native offered me a skin for sale. He stated that it had been killed in the Nandi Forest but as it lacked head, feet and skull I did not accept it. I saw several Tereki war shields which appeared to be made from the tough hides of these giant forest hogs.

BOVIDAE

DAMALISCUS KORRIGUM TOPI Blaine

Damaliscus korrigum topi Blaine, 1914, Ann. Mag. Nat. Hist. (8), **13**, p. 333:
Near Malindi, Kenya Colony.

♂ skull (M. C. Z. 32068) Between Malindi & Golbanti, K. C. 2.v.34.

Distribution. This topotype was shot on the way to Lamu Island south of the Tana. Unfortunately the necessities of three days' incessant travelling through torrential downpours caused the hair to slip despite all precautions. I was particularly sorry to lose it as it was the first skin of any game animal that I have ever shot which I failed to preserve.

Measurements. ♂. 2,000. 430. 510. 195 mm.

Parasites. Ticks.

CEPHALOPHUS MONTICOLA MUSCULOIDES Heller

Cephalophus monticola musculoides Heller, 1913, Smithsonian Misc. Coll., **61**,
No. 7, p. 9: Kakamega Forest, Kenya Colony.

skull & 5 ♂ 1 ♀ (M. C. Z. 31102-3, 31609-10, 31967, 32196, 32286)
Elgoni, K. C. 31. i-6. ii. 34.

♂ juv. (M. C. Z. 32285) Kaimosi, Kakamega, K. C. 23. ii. 34.

Native names. *Ikirungu* (Lugishu); *kabenyet* (Kimasai); *kasendi* (Luragoli); *shiseri* (Lutereki).

Discussion. Lydekker and Blaine (1914, p. 96) regard *musculoides* and other East African forms as races of *melanorheus* (1846) from Fernando Po, treating *monticola* (1789) of Cape Colony as a distinct full species. Hollister (1924, p. 80) follows Heller in regarding all as races of the older *monticola*.

Granvik (1924, p. 31) records a male from Mount Elgon under the name of *aequatorialis* Matschie, described from Chagwe, Uganda. There is no difference to be discerned between our Elgon series and the topotype of Heller's *musculoides*, distinguished by larger size and lighter underparts which contrast with the flanks. It would appear that Granvik's identification was incorrect or, alternatively, that *musculoides* is a synonym of *aequatorialis*.

The horns of one adult male from Elgoni are peculiar in that they have not developed sufficiently to be visible externally. Their bony cores are low knobs with flattened tops which fit into small pockets in the skin instead of penetrating it.

Measurements. Heller's measurements were 525. 85. 170. 55 mm., so that our Elgonyi animals are all larger still, viz. ♂. 643. 104. 165. 54 mm., ♀. 550. 90. 165. 56 mm.

Breeding. At Elgonyi, on February 1, 1934, a native brought in a new-born duiker (♂. 310. 55. 125. 43 mm.), and at Kaimosi, February 23, 1934, another slightly older (♂. 385. 70. 130. 47. mm.). Both said that their dogs had brought them the little creatures.

Parasites. Ticks (*Amblyomma variegata* and nymphal *Rhipicephalus* sp.) were recovered from several duikers of the Elgonyi series, while *Haemaphysalis parvata* were present on the Kaimosi buck.

Enemies. At Madangi, 11,500 feet, the skull was removed from the dried body of a pygmy duiker found at the very edge of a cliff. (Unfortunately it was left behind by the skinner, so lost). The tiny antelope had evidently been cornered by a dog and disembowelled. Though these animals were very common in the alpine meadows they were so wild that it was difficult to get a shot at one. The reason for their wariness was obvious for all day long and almost every day, bands of natives accompanied by large dogs, some of which were belled, made the hills and valleys ring with their shouts and cries as they harried the game. At Kaimosi these duiker have apparently become exceedingly rare. At Elgonyi the skull cap of a duiker which had been killed by a leopard, was collected.

SYLVICAPRA GRIMMIA DESERTI Heller

Sylvicapra grimmia deserti Heller, 1913, Smithsonian Misc. Coll., **61**, No. 17, p. 4: Voi, Kenya Colony.

♀ & fetus (M. C. Z. 31954, 32327) Lamu Id., K. C. 9. v. 34.

Native name. Nguruvu (Kiamu).

Discussion. These skins are referred to the coastal race though they differ little, if at all, in general coloration from inland specimens.

Measurements. ♀. 840. 110. 260. 107 mm.

Breeding. On May 9, 1934, this animal held a fetal ♀. 345. 45. 146. 57 mm. which was practically ready for birth.

Habitat. These duiker, which doubtless owe their introduction on the island to man, are said to be exceedingly common on the sand-hills east of Shella where I shot this animal as it unexpectedly dashed out of a bush.

SYLVICAPRA GRIMMIA LOBELIARUM Lönnberg

Sylvicapra grimmia lobeliarum Lönnberg, 1919, Rev. Zoöl. Africaine, 7, p. 181:
Mount Elgon (at high altitude among lobelias), Kenya Colony.

♂ (M. C. Z. 31608) Kaburomi, K. C. 30. xii. 33.

Distribution. Our specimen is topotypic having been shot above the Kaburomi camp in the alpine zone of Elgon at 11,000 feet.

Native name. *Ekisi* (Lugishu).

Discussion. This adult male has the dark forehead which is mentioned by Lönnberg as a principal character of this montane race.

Measurements. ♂. 870. 100. 272. 107 mm.

Diet. Shot while grazing at 8 a.m. Its stomach was full of grass; no internal nor external parasites observed.

SYLVICAPRA GRIMMIA NYANZAE Neumann

Sylvicapra abyssinica nyanzae Neumann, 1905, Sitz. Ges. naturf. Freunde Berlin, p. 89: Kwa Kitoto, Kavirondo, Kenya Colony.

♀ juv. (M. C. Z. 31618) Kirui, K. C. 28. i. 34.

Native name. *Ekisi* (Kitosh).

Discussion. This young animal, coming from below 7,000 feet on the southern face of Mount Elgon, is referred to *nyanzae* tentatively on geographic grounds.

Measurements. ♀. juv. 500. 50. 186. 70 mm.

Parasites. Ticks were preserved from its fur.

Habits. Many years ago, the late Dr. S. L. Hinde drew attention to the custom of captive duikers killing fowls in the same enclosure. They pulled off the heads and lapped the blood. In 1914, Mr. L. S. B. Leakey told me of his captive duiker doing the same thing. The introduction of a salt lick into the enclosure put an end to the killing of the fowls. This result seemed to show that a desire for salt on the part of the antelope led to what was supposed to be a perversion of character due to captivity.

While I was walking along the western foot of Mount Debasien, I paused on the main trail to shoot a bird in a nearby tree. An exclamation from my gunbearer, however, caused me to turn in time to see a female duiker land with a bound in the road almost on top of a dove, which I had previously observed to be feeding there. They disappeared together, the dove over, the duiker into, the rank grass which flanked the track. The boys averred that the antelope had pounced upon the bird in an effort to seize it. (November 27, 1933).

On the north bank of the Greeki River, therefore also in Karamojo, I had just shot and bagged a guineafowl when, with loud cries, a dozen of the birds rose from long grass a hundred yards away and settled in some small thorn trees. My gunbearer said that he had seen a duiker bound through the grass into the middle of the covey. Certainly the birds were so agitated by what had disturbed them that I was able to approach within range and shoot one of their number. (December 5, 1933).

OUREBIA MONTANA COTTONI Thomas & Wroughton

Ourebia cottoni Thomas & Wroughton, 1908, Ann. Mag. Nat. Hist. (8), 1, p. 178: Sirgoit Rock, Uasin Gishu Plateau, Kenya Colony.

Ourebia microdon Hollister, 1910, Smithsonian Misc. Coll., 56, No. 2, p. 4: South of Nzoia River, Uasin Gishu Plateau, Kenya Colony.

♂ juv. ♂ ♀ (M. C. Z. 31100, 31607, 31971) w. foot Mt. Debasien, U.29. xi. 33.

Measurements. ♂. 1,000. 80. 270 (with hoof 315). 112 mm., ♀. 1,400. 100. 280 (with hoof 325). 100 mm.

Breeding. The juvenile (780. 70. 225 (with hoof 260) 90 mm.) was being weaned. It sprang up from its lair in long grass and was shot with No. 8 from a twelve bore at a distance of thirty feet.

Parasites. Nymphal ticks *Amblyomma* sp. were numerous about the genitalia.

RAPHICEROS CAMPESTRIS NEUMANNI (Matschie)

Pediotragus neumanni Matschie, 1894, Sitz. Ges. naturf. Freunde Berlin, p. 122: Northern Ugogo, Tanganyika Territory.

♀ juv. (M. C. Z. 32329) Peccatoni, K. C. 25. v. 34.

Distribution. This record must be near the northern bounds of the species on the coast. Most of the thirty examples listed by Hollister (1924, p. 94) are from inland localities on the Kenya Plateau.

Measurements. Very young ♀. 315. 65. 125. 52 mm.

RHYNCHOTRAGUS KIRKII KIRKII (Günther)

Neotragus kirkii Günther, 1880, Proc. Zoöl. Soc. London, p. 222: Brava, Italian Somaliland.

5 ♂ 3 ♀ & foetus (M. C. Z. 31946, 31968-70, 32195, 32259-60, 32328) Kitau, Manda Id., K. C. 16-19. v. 34.

Distribution. According to Heller (1913, Smithsonian Misc. Coll., 61, No. 7, p. 4) typical *kirkii* is found along the coast south to the

Tana River; the series shot by Loveridge on Manda near Lamu Island are thus approaching the southern limits of the range of the typical form.

Native name. *Tibi* (Kipokomo).

Discussion. Their cranial dimensions average noticeably smaller than those of the race *nyikae* as described by Heller. The adult males of the former have an upper tooth row of about 32-32.5 mm. as against 37.5-39 mm. in *nyikae*.

Measurements. ♂. 620. 45. 188. 68 mm., ♀. 600. 40. 191. 63 mm.

Breeding. On May 17, 1934, a fetal ♀. 264. 20. 110. 45 mm. was removed. The same day two extremely young dikdik were seen but they were both able to run well.

Enemies. According to the natives, Hunting Dogs from the adjacent mainland invade the island from time to time and harass the dikdik for days before taking their departure.

Habitat. Dikdik are said not to occur on Lamu Island but on Manda they are the dominant mammal. One would encounter at least a dozen in the course of an hour's walk. At one spot nearly three miles north of Kitau they might truly be said to be as common as rabbits in an English pasture; instead of being in pairs, small parties of them would start up on every side and go bounding away.

At eventide it was a pleasant sight to see these diminutive antelopes grazing. As the time of my visit coincided with the breaking of the rains, the acacia were in fresh verdure and presented many miniature park-like spots where the ground was clothed with blades of fresh green grass less than six inches high. At the Kitau end of the island a pair of dikdik would be found feeding in each glade at sunset. At night, as I slept across the entrance of the tent, I was awakened several times by the explosive snort of one of these animals which had wandered to within thirty feet of my bed.

RHYNCHOTRAGUS KIRKII NYIKAE Heller

Rhynchotragus kirki nyikae Heller, 1913, Smithsonian Misc. Coll., **61**, No. 7, p. 3: Ndi, Taita, Kenya Colony.

♂ ♀ (M. C. Z. 31945, 31956) Tsavo, K. C. 4. iv. 34.

♂ (M. C. Z. 31953) Karawa, near Malindi, K. C. 26. vi. 34.

Distribution. The Tsavo specimens are almost topotypic for Tsavo is only nineteen miles west of Ndi, the latter being thirteen miles west of Voi.

Discussion. These three dikdik agree in having cranial dimensions slightly larger than those of typical *kirkii*, the tooth rows also being larger as mentioned above.

Measurements. ♂. (Karawa) 630. 40. 190. 64 mm., ♀. (Tsavo) 640. 66. 192. 72 mm.

Breeding. At Tsavo, on April 4, 1934, the female carried a fetal ♂. 200. 13. 76. 29 mm., which was preserved in alcohol.

Habitat. The Tsavo pair were shot in the dry scrub within a hundred yards of Tsavo station, with a right and left of No. 3 shot from the twelve bore.

KOBUS ELLIPSIPRYMNUS KURU Heller

Kobus ellipsiprymnus kuru Heller, 1913, Smithsonian Misc. Coll., **61**, No. 13, p. 6: Taveta, Kenya Colony.

♂ (M. C. Z. 31974) Wema, Ngatana, K. C. 11. vi. 34.

Native name. *Kuyo* (Kipokomo).

Discussion. Neither Lydekker and Blaine (1914, p. 230) nor Hollister (1924, p. 104) venture an opinion as to the validity of this supposed race; the latter, however, suggests that it should be compared with the race *kulu* described by Matschie (1911) from Maliwe, west of Kilwa in southern Tanganyika Territory.

Measurements. ♂. 1,500. 396. 475. 195 mm.

Breeding. This fine animal was accompanied by about twenty females but no young. They were in a marsh just a mile east of Wema, and a quarter of a mile from the north bank of the Tana River.

KOBUS DEFASSA UGANDAE Neumann

Kobus unctuosus ugandae Neumann, 1905, Sitz. Ges. naturf. Freunde Berlin, p. 92: Maianda Valley, northern Uganda.

♂ (M. C. Z. 31600) Elgoni, K. C. 28. i. 34.

Native names. *Amosemos* (Karamojong); *saramet* (Kimasai); *ekhuro* (Kitosh).

Discussion. This fine male, not wholly mature, conforms well to *ugandae* as redescribed by Lydekker. Of the various races briefly characterized by Matschie and Lönnberg, this may be closely similar to *tjäderi* Lönnberg (1907, northwestern Laikipia Plateau, west of the junction of the Guaso Nyiro and Guaso Hanek), *nzoiae* Matschie (1910, Uasin Gishu Plateau) and *fulvifrons* Matschie (1910, east of Kitosh, between the Guaso Masa and Nzoia Rivers) but until the

validity of these supposed races can be determined, Lydekker's use of *ugandae* for all the defassa waterbuck of this area seems best.

Measurements. ♂. 1,770. 325. 520. 213 mm.

Parasites. Through an oversight, the numerous cestodes which were removed from its stomach were not preserved.

Habitat. Shot at 10 A.M. while grazing alone on the mountainside at 8,000 feet, far from any water; nevertheless waterbuck tracks were common in the dense thickets close by.

TRAGELAPHUS SCRIPTUS DELAMEREI Pocock

Tragelaphus delamerei Pocock, 1900, Ann. Mag. Nat. Hist. (7), 5, p. 95: Sayer, northeastern limits of Laikipia Plateau, Kenya Colony.

♀ (M. C. Z. 31613) Elgonyi, K. C. 1. ii. 34.

Distribution. Bushbuck were frequently heard barking in the forests on the western slopes of Mount Debasien, but none was seen. They would be referable to the race *laticeps* Matschie (1912) described from the northwestern base of Debasien, should that race be recognizable. Bushbuck were often heard at Sipi and Butandiga on the western slopes of Mount Elgon, which is the type locality of *heterochrous* Cabrera (1918), but were so harried by the native hunters that none was encountered.

Native name. *Aderit* (Karamojong).

Coloration. This female from Elgonyi agrees perfectly with one from Mwanza on the south shore of Lake Victoria, in the rich rufous tone of the dorsal surfaces, narrow black spinal stripe with slight admixture of white hairs, almost complete suppression of the transverse body stripes, which, however, may be faintly traceable, three or four in number, while the lateral row of white spots is largely absent. Males are much darker, blackish brown above instead of red, with the white markings similarly suppressed or altogether absent. This more intensely colored race, therefore, inhabits the highlands of Kenya Colony from the Elgon region and northern border of Tanganyika at least to the southern end of Lake Victoria.

Measurements. ♀. 1,300. 150. 357. 142 mm.

Breeding. She was gravid with a small hairless fetal ♂. 203. 30. 59. 24 mm.

Diet. Shot while grazing at 6 P.M., the stomach held grass only, no parasites being observed.

Enemies. In certain parts of western Elgon almost every third man (Bagishu) one met was dressed in a bushbuck (*T. s. heterochrous*) skin.

TRAGELAPHUS SCRIPTUS MASSAICUS Neumann

Tragelaphus massaicus Neumann, 1902, Sitz. Ges. naturf. Freunde Berlin, p. 96: Upper Bubu River, northwestern Irangi, Tanganyika Territory.

♂ (M. C. Z. 31955) Kibwezi, K. C. 28. iii. 34.

♂ skull (M. C. Z. 31976) Voi, K. C. 10. iv. 34.

Discussion. Mr. A. B. C. Smith, long resident at Kibwezi, told Loveridge that the horns of the local bushbuck were very short, not exceeding fifteen inches in length he should think.

Measurements. ♂. 1, 290. 200. 350. 413 mm.

Habitat. One of a pair that were lying up in long grass within a couple of hundred yards of the station.

Parasites. Ticks (*Rhipicephalus maculatus*) were found in the fur.

TRAGELAPHUS SCRIPTUS OLIVACEUS Heller

Tragelaphus scriptus olivaceus Heller, 1913, Smithsonian Misc. Coll., **61**, No. 13, p. 1: Maji ya chumvi, Kenya Colony.

♀ (M. C. Z. 31972) Lamu Island, K. C. 9. v. 34.

Distribution. A female was also seen on Manda Island. Hollister (1924, p. 128) appears to regard this as a valid form, representing a pale coastal race. Whether or not it is really separable from some of the pale races described from Somaliland and Ethiopia remains to be seen, but it may stand for the present.

Native name. *Kungu* (Kiamu).

Coloration. The female from Lamu is obviously paler than specimens of *massaicus* from Tanganyika Territory. It is more ochraceous buff on the sides, the central dorsal area less contrastingly brown; about four pairs of transverse body stripes are more clearly, though not sharply, marked; a lateral row of white spots becomes more numerous on the haunches; there is an elongate white mark in advance of the root of the tail on each side.

Measurements. ♀. 1, 123. 80. 335. 130 mm.

Breeding. I regretted to find that this animal was in milk.

Habitat. On several occasions, we came upon the tracks of bushbuck in the sandhills east of Shella. I had followed up one of these for a mile when a doe sprang out on the further side of a bush which I was passing, I shot it, though not fatally, and had to follow it for a mile before getting it with the second shot. These animals have so far adapted themselves to local conditions that they pause and look back when topping each high dune. It is supposed that captive specimens escaped, or that the species was deliberately introduced on to the island in bygone days.

ELEPHANTIDAE

LOXODONTA AFRICANA PEELI (Lydekker)

Elephas africanus peeli Lydekker, 1907, Proc. Zool. Soc. London, p. 393:
Aberdare Mountains, Kenya Colony.

Field Notes. Signs of elephant were numerous on Mount Debasien, a small skull was found in a ravine at about 7,000 feet and another in the patch of forest at the western foot of the mountain. At the time of my visit, however, (November, 1933) they had departed for the swamps in the vicinity of Lake Gedge, Karamajo.

When the country flanking the Greeki River, due north of Mount Elgon, is flooded, elephant must be very plentiful if one may judge by the abundance of spoor. One of my skimmers found a pair of tusks, which had been exposed by the recent burning of the grass in which they had been hidden. In accordance with regulations these were turned over to the District Officer and the reward for 'found ivory' paid to the discoverer.

During our safari through the semiflooded coastal plain between the Tana River and Malindi, evidence of the presence of elephants was of hourly occurrence. Nevertheless only one was seen, and that by the porters whom I had preceded by an hour. They halted and so did the elephant which, after looking at them, made off.

Folklore. I am indebted to Miss Parker of the mission at Kaimosi for the substance both of the following story and the Maragoli tales about baboons already recorded.

Once upon a time a man set out to dig a pit in which to trap an elephant. As he was engaged in digging, two elephants accompanied by their young came along the path and hailed the man, whose name was Shikhuyakluya. "What are you digging?" they asked. "I am digging for rats," was the reply. The elephants knew better, however, and challenged him with the remark: "It would be as well for you to brush us." (This being in reference to a sacrificial ceremony).

The man picked up a nearby reed as he enquired of an elephant: "Shall I brush you with this?" and received a reply in the affirmative. As he began to brush them with the reed, he chanted these words: "Be well, keep your eyes open and see that you do not fall into this hole." After brushing the parents, he turned to the children, but to them he muttered in a low voice so that their parents would not hear "May your eyes be closed so that you cannot see clearly. Fall into this pit." When the little elephants heard this they said to their father and mother: "Shikhuyakluya said for us to fall into the pit."

Shikhuyakluya denied the accusation, saying: "Perhaps the children did not hear correctly." Then the old elephants agreed, saying: "Our children are very young and probably did not understand." The ceremony being finished the elephants departed on their way.

The man recommenced work on the pit; on finishing it, he covered the hole with branches and leaves before taking his departure. Long afterwards, the elephants returned that way having forgotten all about the pit during the intervening time. They followed their usual path until one of the young animals fell into the hole. Only then did the old ones remember, and because they did not want Shikhuyakluya to get their little one they covered him up with earth from the heap still lying beside the path. Thus did they bury the little elephant alive and then continued on their way with their one remaining child.

PROCAVIIDAE

PROCAVIA HABESSINICA DAEMON Thomas

Procapia daemon Thomas, 1910, Ann. Mag. Nat. Hist. (8), **5**, p. 199: Elgonyi, southern slopes of Mount Elgon at 7,000 feet, Kenya Colony.

Procapia daemon varians Granvik, 1924, Lunds Univers. Arsskr., N. F., **21**, No. 3, p. 26: Eastern slopes of Mount Elgon at 7,000 feet, Kenya Colony.

2 ♂ (M. C. Z. 31097, 32477) Kirui, Mt. Elgon, K. C. 20 & 23.
i. 34.

1 + 5 ♂ 7 ♀ (M. C. Z. 31096, 31098, 31603-5, 32197-202, 32461-2) Elgonyi, K. C. 24-31. i. 34.

Native names. So far as could be ascertained, the Masai at Elgonyi did not differentiate between this and the following species which they called *mutunyet*.

Coloration. This fine series of topotypes is fairly uniform, although the extremes of variation differ obviously; on the one hand the darkest individuals with the crown dark blackish brown, minutely peppered with grayish, and the dorsal surfaces much mixed with longer black hairs; on the other, the palest skins with the pale rings on the hairs of the forehead nearly twice as broad, the black hairs on the dorsum much fewer, giving the back a much more buffy tone. The lower side is bright ochraceous buffy in all as is also the dorsal spot.

Measurements. ♂. 540. 0. 70. 35 mm., ♀. 580. 0. 72. 39 mm.

Breeding. At Elgonyi, on January 23, 1934, two of the largest of the series each held three fetuses, a third only two of an average size of 165. 0. 31. 17 mm.

Parasites. Fleas swarmed on some individuals while many others were infested with nematodes (*Crossophorus collaris* and *Trichuris* sp.)

Habitat. Plentiful on the rock-strewn slopes of the escarpment; many were seen in the vicinity of Kemp's Cave both on the cliff face and in trees growing from it.

HETEROHYRAX SYRIACUS KEMPI (Thomas)

Procavia brucei kempi Thomas, 1910, Ann. Mag. Nat. Hist. (8), 5, p. 200: Elgonyi, Mount Elgon at 7,000 feet, Kenya Colony.

♀ (M. C. Z. 32476) Kaburomi, U. 28. xii. 33.

♀ (M. C. Z.) Butandiga, U. 9. i. 34.

♂ ♀ (M. C. Z. 32473, 32475) Kirui, K. C. 22-23. i. 34.

♂ (M. C. Z. 32474) Elgonyi, K. C. 28. i. 34.

Distribution. All these localities are on, or close to, Mount Elgon, the first above Loveridge's camp at 11,000 feet, the second and fourth at 7,000 feet, while Kirui is at the southern foot about 5,000 feet.

Native names. *Adukwa* (Karamojong); *kwenera* (Kisabei); *kigen-erwa* (Lugishu); *mutunyet* (Kimasai); *lihenele* (Luragoli); *haterera* (Lutereki).

Coloration. This montane form averages a more uniform gray beneath, the chest and underside of forelimbs in particular contrasting with those of *H. s. hindei* in which race they are usually pure white to the roots of the hair though occasional specimens display a cloudiness which would render them difficult to distinguish from *kempi*. The character of head pelage being darker than the dorsal pelage, utilized by Hahn (1934, pp. 276-277) to distinguish the two forms was flatly contradicted by our material for the four adults of *kempi* conform to Hahn's definition of *hindei* in this respect.

Measurements. ♂. (Kirui) 470. 0. 67. 31 mm., ♀. (Kirui) 325. 0. 52. 30 mm.

Parasites. The stomach of the Kaburomi specimen was full of grass but free of parasites so far as could be seen, which came as somewhat of a surprise for in Tanganyika Territory most hyraxes support a heavy infestation of nematodes and cestodes.

Enemies. At Sipi (6,500 feet) I was told that hyrax were formerly plentiful but had "been driven away by the numerous goats." I thought this answer rather imaginative till I visited their haunts above Kaburomi in the alpine zone. There I saw a herd of goats, the property of one of the cave-dwelling Wanderobo, clambering about a

cliff face which had almost certainly been the home of hyrax in former times.

It is more probable, however, that it was the constant hunting by voracious Bagishu natives that reduced their numbers at Sipi; even at the remote spot where they occurred above Kaburomi, snares and traps had been set in their runways by Wanderobo who, like the Bagishu, look upon them as a regular source of food.

Habitat. At Kaburomi they occurred in a rocky gorge which was very overgrown with creepers and relatively heavily wooded with tree heath; the ravine was about an hour's walk above my camp.

One of these hyrax was seen just below Jackson's Summit, Mount Elgon, at about 13,000 feet, at an unusually early hour. It was 6.40 a.m., just twenty minutes before the sun rose over the mountain and so cold that there was frost on all the vegetation and ice on an adjacent lake.

Droppings of hyrax were found among the rocks of the Nandi Escarpment near Kaimosi. The animal is well known to both Maragoli and Watereki, but has evidently been hunted so persistently that all my efforts to secure one during my stay there, failed.

At Kirui as well as in their type locality, Elgonyi, these animals occur on the rocks of the escarpment alongside *P. h. daemon*.

HETEROHYRAX SYRIACUS HINDEI (Wroughton)

Procavia brucei hindei Wroughton, 1910, Ann. Mag. Nat. Hist. (8), 5, p. 107: Fort Hall, Kenya Colony.

Procavia brucei maculata Osgood, 1910, Publ. Field Mus. Nat. Hist., Zool. Series, 10, p. 6: Lukenya Mountain, Ulukeny Hills, Kenya Colony.

10 ♂ 4 ♀ (M. C. Z. 31952, 31964, 32338-9, 32385-8, 32463-8) Kibwezi, K. C. 24 & 27. iii. 34.

3 ♂ 5 ♀ (M. C. Z. 31965-6, 32349-51, 32389-90, 32469) Tsavo, K. C. 31. iii. 34.

3 ♂ 8 ♀ (M. C. Z. 31942-3, 32340-8) Mt. Mbololo, K. C. 19-27. iv. 34.

Native name. *Ngivu* (Kitaita).

Discussion. Hahn (1934, p. 271) considers all the described forms of *Heterohyrax* to be races of the single species *syriacus*. We are, however, not at all convinced that the very small *pumila*, and its subspecies *rudolfi*, are not a distinct species.

Coloration. The fine series collected is fairly uniform in appearance, though the dorsal spot may vary in color from clear white with a trace of ochraceous tipping, to nearly entirely ochraceous.

Measurements. ♂. (Kibwezi) 470. 0. 69. 32 mm., ♀. (Kibwezi) 480. 0. 65. 30 mm.

Breeding. At Kibwezi neither of the two females shot on March 24, 1934, was gravid, but both shot on the 27th were; one held a large fetus measuring 145 mm. from snout to anus with a hind foot of 24 mm., the other held two fetuses of much smaller dimensions.

On Mount Mbololo, April 26, 1934, a female held a single fetus measuring 203. 0. 33. 22 mm.; on the 27th, each of two females held two fetuses ready for birth and measuring from 185. 0. 35. 21 mm., to ♀. 215. 0. 36. 22 mm.

Parasites. Both cestodes (*Anoplocephala opatula*) and nematodes (*Crossophorus collaris* and *Setaria hyracis*) were numerous in the Kibwezi series.

Habitat. At Kibwezi, a young Mkamba offered to guide me to a locality where hyrax were numerous. For a couple of miles he led me southwest of the railway line till we reached scrub forest growing on the lava which covers so much of this neighborhood. The headquarters of the animals were in volcanic craters which were below the general ground level; in these hollows were numerous masses of lava and big caverns. Besides shooting some among these rocks, others were obtained in trees as they squatted on horizontal limbs or in crotches of the main stem up to heights of thirty feet from the ground. In such situations they were only seen from 8 to 10 in the early morning; as soon as the sun became powerful (11 to 12 noon) they descended and were to be detected on gnarled branches in the bush at not more than six feet from the ground. The path that traversed this wilderness of thicket was much used by natives from 6 till 10 a.m. so that the hyrax were accustomed to the sight of human beings and appeared to study them with a mildly interested curiosity. If, however, one moved from the path, at the first footfall on the dead leaves which carpeted this dry scrub, most of these hyrax vanished. It was rarely necessary to leave the path and the first seven were secured with seven shots (No. 5 from twelve bore). Finding the males were in such a heavy preponderance (ratio of 5 to 2), I returned three days later and shot seven more but found the proportion remained the same (5 to 2). Whether this inequality of the sexes is due to the females being more wary than the males, or whether it is fortuitous, I cannot say. I judge, however, that the Wakamba do not molest the hyrax to any appreciable extent; not one of them came to camp asking for their bodies. My Bagishu skimmers on the other hand made themselves ill with a surfeit of hyrax meat.

At Tsavo, hyraxes were found on rocky hills a mile and a half north of the station, the environment and temperature conditions being vastly different from those obtaining at Kibwezi.

On Mount Mbololo they occurred in a great jumble of rocks and tangled undergrowth at the foot of a precipice on the southern (?) side of the mountain at an altitude of about 3,500 feet.

DENDROHYRAX ARBOREUS STUHLMANNI (Matschie)

Procavia stuhlmanni Matschie, 1892, Sitz. Ges. naturf. Freunde Berlin, p. 111: Bukoba, Tanganyika Territory.

♂ (M. C. Z. 31602) Kirui, K. C. 23. i. 34.

♂ (M. C. Z. 31099) Elgoni, K. C. i. 34.

Coloration. These two tree hyrax from Mount Elgon are provisionally referred to this race, following Hahn's 1934 revision, although they are a trifle darker brown than a topotype from Bukoba, Tanganyika Territory. The crown of the head is contrastingly dark blackish brown, with little admixture of buffy-ringed hairs, such as prevail over the rest of the dorsum. The sides of the body are barely paler though the bases of the hairs along the sides are much less dark than in the median region. On the belly the hair is clear whitish to the bases. The cheeks are mixed pale and blackish brown, the latter prevailing, and there is a slight trace of a pale supraorbital spot.

Measurements. ♂. (Elgoni) 550. 0. 75. 36 mm.

DENDROHYRAX ARBOREUS BETTONI (Thomas & Schwann)

Procavia bettoni Thomas & Schwann, 1904, Abstr. Proc. Zool. Soc. London, No. 6, p. 23, April 26: Rogoro, Kikuyu, Kenya Colony.

Procavia (Dendrohyrax) scheffleri Brauer, 1913, Sitz. Ges. naturf. Freunde Berlin, p. 131: Teleki River, Kibwezi, Kenya Colony.

Procavia (Dendrohyrax) vilhelmi Lönnberg, 1916, Arkiv för Zoölogi, 10, No. 12, p. 26: Donyo Sabuk, Kenya Colony.

♂ (M. C. Z. 31944) Mt. Mbololo, K. C. 17. iv. 34.

Distribution. This single specimen is doubtless referable to this race although the locality, Mount Mbololo, is considerably nearer to the coast than Rogoro, whence came the type. It is, however, only about seventy-five miles southeast of Kibwezi, type locality of *scheffleri* which Hahn (1934, p. 267) refers to the synonymy.

Native name. *Mbelele* (Kitaita).

Discussion. Though in color the skin of this specimen is practically indistinguishable from those of *stuhlmanni* from Mount Elgon, the skull differs notably in the much larger incisors and longer rostrum. The greatest length of the nasals is 29 mm. against 23.5 mm. in a skull of *stuhlmanni* of comparable size and age. The median point of the frontals lies on the same transverse plane as the front of the orbit in front of the lachrymal bone, whereas in the two skulls of *stuhlmanni* from Elgon it falls in advance of the orbit and even in front of the anterior root of the zygoma.

Measurements. ♂. 500. 0. 75. 23 mm. Weight 6 pounds.

Voice. Shortly after my arrival at Kibwezi station at 2.22 a.m., when preparing to sleep on the platform, I heard the raucous cries of these hyrax in close proximity to the station; later I ascertained that they came from the big trees fringing the river. The cry is like an exaggerated and prolonged call of the Square-marked Toad (*Bufo r. regularis*) and tails off like that of the Galago (*G. senegalensis lasiotis*); in other words it begins with a sound like a watchman's rattle combined with a sawing note and ends with a 'quek-quek' crescendo. Immediately after sunrise, I set off and spent a couple of hours searching for them in the dense tangle among the big trees growing north of the line, but without sighting one.

Enemies. According to my native employees (Bagishu, Mganda and Karamojong), the flesh of this animal was "as bitter as quinine" and though they had looked forward to eating it, after a trial they rejected most of the meat.

Habitat. Very abundant in the cap of forest on the summit (4,800 ft.) of Mbololo. The trees were such a height, however, and the animals so wary that it was only after persistent hunting that I succeeded in bringing one down after firing both barrels of a twelve bore loaded with No. 3 shot. Even then, after falling from this great height, it made off through the undergrowth and might well have escaped had not my gunbearer pluckily pursued and secured it.

DELPHINIDAE

PRODELPHINUS ATTENUATUS (Gray)

Steno attenuatus Gray, 1846, in "Voyage of the Erebus and Terror," Zoöl. p. 44, pl. xxviii: Cape of Good Hope.

Cranium (M. C. Z. 31734) Malindi, K. C. 30 vi. 34.

Discussion. This well-preserved cranium, picked up on the sea-

shore, agrees essentially with True's description of this species. Although the tips of the premaxillaries are slightly beachworn, the maxillary bones show forty-nine tooth sockets on each side.

DUGONGIDAE

DUGONG DUGON (Müller)

Trichechus dugon P. S. L. Müller, 1776, in Linné, Vollständiger Natursystems, Suppl., p. 21: "Vorgeburge der Guten Hofnung an, bis an die philippinischen Inseln."

Halicore dugung Erxleben, 1777, Syst. regn. animal., Classis I, Mammalia, p. 599

Discussion. Müller's name *dugon* clearly antedates Erxleben's *dugung* for the same animal.

Field Note. Dugong are said by the natives to be fairly common along the Lamu coast. While I was staying at Lamu, some fishermen took one of these animals in their nets and brought it in their boat for my inspection. The meat has a high commercial value, nevertheless, I was surprised that they refused my offer of ten shillings (\$2.50) to be allowed to skin the animal, retaining skin and skull only. Possibly Moslem laws influenced their decision.

BIBLIOGRAPHY

ALLEN, GLOVER M. and LOVERIDGE, A.

1927. "Mammals from the Uluguru and Usambara Mountains, Tanganyika Territory." *Proc. Boston Soc. Nat. Hist.*, **38**, pp. 413-441.
 1933. "Reports on the Scientific Results of an Expedition to the South-western Highlands of Tanganyika Territory. II. Mammals." *Bull. Mus. Comp. Zool.*, **75**, pp. 45-140, pl. i.

GRANVIK, HUGO

1924. "Mammals from the Eastern Slopes of Mount Elgon, Kenya Colony." *Lunds Univers. Arsskrift* (2), **21**, No. 3, pp. 1-32, pl. i-ii and text figs.

HAHN, HERBERT

1934. "Die Familie der Procaviidae." *Zeitschr. f. Säugetierkunde*, **9**, pp. 207-358, figs. 1-69, pls. xiii-xvi.

HOLLISTER, NED

1918. "East African Mammals in the United States National Museum. I. Insectivora, Chiroptera, and Carnivora." *U. S. Nat. Mus. Bull.* 99, pp. 1-194, figs. 1-3, pls. i-iv.
 1919. "East African Mammals in the United States National Museum. II. Rodentia, Lagomorpha, and Tubulidentata." *U. S. Nat. Mus. Bull.* 99, pp. 1-184, fig. 1, pls. i-xliv.
 1924. "East African Mammals in the United States National Museum. III. Primates, Artiodactyla, Perissodactyla, Proboscidea, and Hyracoidea." *U. S. Nat. Mus. Bull.* 99, pp. 1-164, fig. 1, pls. i-vii.

LYDEKKER, RICHARD and BLAINE, G.

1914. "Catalogue of the Ungulate Mammals in the British Museum (Natural History)." 8vo, London, **2**, pp. i-xiii and 1-295, figs. 1-33.

SCHWARZ, ERNST

- 1928a. "Notes on the Classification of the African Monkeys in the genus *Cercopithecus*, Erxleben." *Ann. Mag. Nat. Hist.* (10), **1**, pp. 649-663.
 1928b. "The Species of the genus *Cercocebus*, E. Geoffroy." *Ann. Mag. Nat. Hist.* (10), **1**, pp. 664-670.
 1928c. "Bemerkungen über die roten Stummelaffen." *Zeitschr. f. Säugetierk.*, **3**, pp. 92-97.
 1929. "On the local Races and Distribution of the Black and White *Colobus* Monkeys." *Proc. Zool. Soc. London*, pp. 585-598, map.
 1931a. "On the African Long-tailed Lemurs or Galagos." *Ann. Mag. Nat. Hist.* (10), **7**, pp. 41-66.
 1931b. "On the African Short-tailed Lemurs or Pottos." *Ann. Mag. Nat. Hist.* (10), **8**, pp. 249-256.

EXPLANATION OF PLATES



PLATE 1

PLATE 1

Fig. 1. EASTERN POTTO (*Perodicticus potto ibeanus*)

This arboreal relative of the lemurs progresses on all slender boughs in a sloth-like fashion with its back downwards, it also descends tree trunks head foremost.

Fig. 2. A POTTO TURNING TO DESCEND TO THE GROUND

Natives assert that if a potto is seized by the nape, the points of its cervical vertebrae, which protrude through the skin, are brought into defensive action by a backward jerk of the head. Both photographs taken at Kaimosi of an animal captured in vicinity.



1



2



PLATE 2

PLATE 2

Fig. 1. SCALYTAIL FLYING SQUIRREL (*Anomalurus jacksoni*)

These large squirrels, measuring two feet from nose to tip of tail, are common to the forests of both Kakamega and Mount Elgon. The figured specimen is dead, having just been shot through the chest by the arrow of an Mgishu hunter.

Fig. 2. AN ARBOREAL MOUSE (*Thamnomys surdaster elgonis*)

This specimen was photographed at Kaimosi, Kakamega, so is a topotype of the synonym *Thamnomys s. discolor*. This animal was trapped by utilizing banana as a bait; nests found in wild bananas were attributed to these mice by Watereki natives.



1



2



PLATE 3

PLATE 3

Fig. 1. YOUNG GRAY FOREST DORMICE (*Claviglis saturatus*)

These delightful little creatures, taken in mid-January from their nest at Butandiga on the western slopes of Mount Elgon, are shown feeding on bread and milk; the lid of a shaving-stick container serves them as a bowl.

Fig. 2. AN ADULT PYGMY MOUSE (*Leggada grata grata*)

Many species of pygmy mice were encountered during the trip. After repeated, but unsuccessful, attempts to photograph some in their natural surroundings, the tail of one was held between the fingers whose owner hoped that the mouse would not retaliate with its sharp little teeth. Sipi, Mount Elgon, Uganda.



1



2



PLATE 4

PLATE 4

Fig. 1. SWAMP RAT (*Otomys tropicalis elgonis*) AND YOUNG

Swamp rats are abundant on western Elgon where they are preyed upon by genets, tree civets, mongoose and wild cats. The animal in the photograph is actually suckling two young. She was afterwards released. Sipi, Mt. Elgon.

Fig. 2. A BRUSH-TAILED PORCUPINE (*Atherurus turneri*)

A good series of topotypes of this recently-described species of forest-dwelling porcupine was obtained at Kaimosi, Kakamega, Kenya Colony, where the genus reaches the eastern limits of its distribution in Africa.



1



2

PLATE 5

PLATE 5

Fig. 1. A YOUNG WATERBUCK (*Cobus ellipsiprymnus kuru*)

In the text will be found an account of how one of these young antelope was driven into Tsavo River by a pack of hunting dogs. The photograph, however, was taken at Witu, and is reproduced here by the courtesy of Mr. R. D. Milne.

Fig. 2. A DUGONG (*Dugong dugon*) AT LAMU ISLAND, K. C.

Dugong are relatively common along the Lamu coast where they are highly prized by the natives for their flesh. Fishermen offered to sell one to Mr. Loveridge and brought it in their boat for his inspection. We are indebted to J. MacDougall, Esq., of Lamu, for the photograph.

•



1



2



Bulletin of the Museum of Comparative Zoölogy
AT HARVARD COLLEGE
VOL. LXXIX, No. 4

The Library
Museum of Comparative
Harvard University

SCIENTIFIC RESULTS OF AN EXPEDITION
TO RAIN FOREST REGIONS IN EASTERN AFRICA

IV
BIRDS

BY JAMES LEE PETERS AND ARTHUR LOVERIDGE

WITH TWO PLATES

CAMBRIDGE, MASS., U. S. A.
PRINTED FOR THE MUSEUM
JANUARY, 1936

No. 3. — *Reports on the Scientific Results of an Expedition
to Rain Forest Regions in Eastern Africa*

IV

Birds

BY JAMES LEE PETERS AND ARTHUR LOVERIDGE

CONTENTS

| | PAGE |
|-------------------------------------|------|
| Introduction | 129 |
| List of Species collected | 131 |
| Systematic discussion | 138 |
| Bibliography | 204 |

INTRODUCTION

The collection on which the following report is based, was made by the junior author while investigating the herpetological fauna of certain rain forest areas in Uganda and Kenya. This was carried out on behalf of the Museum of Comparative Zoölogy with a fellowship granted by the John Simon Guggenheim Foundation of New York.

Altitudes and other information regarding the localities where collecting was done, will be furnished in the final report. In addition to giving the itinerary this paper will deal with the conclusions arrived at regarding these forest faunae in relation to those of the Usambara and Uluguru Mountains in Tanganyika Territory.

In view of the intensive study already directed to the ornithology of this region by van Someren and Granvik, less attention was directed to this group of vertebrates than would have been the case otherwise. The period of bird collecting was from November 9, 1933 to June 29, 1934, during which time 530 skins representing 228 species, or races, of birds were secured. Twenty of these were migrants; such are distinguished by an asterisk in the following pages.

So well is the avifauna of this region represented in the Museum of Comparative Zoölogy that only eight forms proved new to the collections. Only one race and one species appeared to require description, viz.

Tyto capensis libratus from Kaimosi, K. C.

Zosterops silvanus from Mount Mbololo, K. C. and this has been done.¹

Besides discussions on variation and synonymy, field notes are included on the nesting habits and diet of certain species including eight forms additional to those of which skins were collected. In this connection attention is directed to what is, according to a letter from Mr. W. L. Slater, apparently the first record of the eggs of *Ixobrychus sturmi*. The statements in the literature as to the laying of blue eggs by this species appear to be erroneous, originally based on supposition and subsequently copied by one author after another. In connection with these field notes occasionally it has been found necessary to use the personal pronoun, in such instances it refers to the junior author as collector.

Parasites are treated under a separate heading following the species in, or on, which they were found. Here we should like to express our indebtedness to our colleagues, Dr. J. Bequaert and Dr. J. H. Sandground for marking the determinations of the ecto- and endoparasites respectively.

We take this opportunity of thanking Messrs. Claude H. B. Grant, Herbert Friedman and W. L. Slater for their kindness in loaning or comparing specimens of certain green pigeons, thrushes or white-eyes. Mr. Slater's monumental work, the *Systema Avium Aethiopicarum*, has been of the greatest assistance. Reference to other works consulted will be found in the bibliography at the end of this paper.

The order of families adopted is that of Wetmore (1934) while the arrangement of species is according to Peters (1931 and 1934) to the end of the Burhinidae, thereafter following that of Slater (1924 and 1930). As this rearrangement may prove somewhat confusing and render difficult the locating of a species in the text, we provide an indexed list of species, as follows.

¹ Peters and Loveridge, 1935, *Proc. Biol. Soc. Washington*, **48**, p. 77.

*List of Species Collected**

| | Page |
|---|------|
| PELECANIDAE | |
| <i>Pelecanus rufescens</i> Gmelin | 138 |
| PHALACROCORACIDAE | |
| <i>Haliëtor africanus africanus</i> (Gmelin) | 139 |
| ARDEIDAE | |
| <i>Ardea cinerea cinerea</i> Linné | 139 |
| <i>Camerodius albus melanorhynchus</i> (Wagler) | 139 |
| <i>Ixobrychus sturmi</i> (Wagler) | 139 |
| CICONIIDAE | |
| <i>Ibis ibis</i> (Linné) | 140 |
| <i>Anastomus lamelligerus lamelligerus</i> Temminck | 141 |
| <i>Leptoptilos crumeniferus</i> (Lesson) | 141 |
| THRESKIORNITHIDAE | |
| <i>Threskiornis aethiopica aethiopica</i> (Latham) | 141 |
| <i>Hagedashia hagedash nilotica</i> Neumann | 142 |
| ANATIDAE | |
| <i>Sarkidiornis melanonota</i> (Pennant) | 142 |
| <i>Anas sparsa leucostigma</i> Rüppell | 142 |
| <i>Anas punctata punctata</i> Burchell | 143 |
| ACCIPITRIDAE | |
| <i>Elanus caeruleus caeruleus</i> (Desfontaines) | 142 |
| <i>Milvus migrans parasitus</i> (Daudin) | 142 |
| <i>Meliërax musicus poliopterus</i> Cabanis | 144 |
| <i>Meliërax metabates metabates</i> Heuglin | 144 |
| <i>Buteo rufofuscus augur</i> Rüppell | 145 |
| <i>Buteo vulpinus vulpinus</i> (Gloger) | 145 |
| <i>Kaupifalco monogrammicus</i> (Temminck) | 145 |
| <i>Butastur rufipennis</i> (Sundevall) | 146 |
| <i>Lophæctus occipitalis</i> (Daudin) | 146 |
| <i>Aquila wahlbergi</i> Sundevall | 147 |
| <i>Haliaeetus vocifer clamans</i> C. L. Brehm | 147 |
| <i>Necrosyrtes monachus monachus</i> (Temminck) | 148 |
| * <i>Circus macrourus</i> (S. G. Gmelin) | 148 |
| * <i>Circaëtus gallicus gallicus</i> (Gmelin) | 148 |
| <i>Circaëtus fasciolatus</i> Gurney | 148 |

* An asterisk denotes a migrant.

FALCONIDAE

Page

| | |
|--|-----|
| <i>Polihiërax semitorquatus deckeni</i> Zedlitz | 149 |
| * <i>Falco tinnunculus tinnunculus</i> Linné | 149 |
| <i>Falco tinnunculus carlo</i> (Hartert & Neumann) | 149 |

PHASIANIDAE

| | |
|---|-----|
| <i>Francolinus sephaena grantii</i> Hartlaub | 150 |
| <i>Francolinus clappertoni gedgii</i> Ogilvie-Grant | 150 |
| <i>Francolinus hildebrandti hildebrandti</i> Cabanis | 150 |
| <i>Francolinus squamatus zappeyi</i> Mearns | 151 |
| <i>Pternistis afer leucoparacus</i> (Fischer & Reichenow) | 151 |

NUMIDIDAE

| | |
|--|-----|
| <i>Numida meleagris major</i> Hartlaub | 151 |
| <i>Guttera edouardi sethsmithi</i> Neumann | 152 |

RALLIDAE

| | |
|--|-----|
| <i>Limnocorax flavirostra</i> (Swainson) | 152 |
| <i>Sarothrura rufa elizabethae</i> van Someren | 152 |
| <i>Sarothrura pulchra centralis</i> Neumann | 152 |
| <i>Sarothrura elegans reichenowi</i> (Sharpe) | 153 |

CHARADRIIDAE

| | |
|--|-----|
| <i>Hoplopterus spinosus</i> (Linné) | 153 |
| <i>Charadrius pecuarius pecuarius</i> Temminck | 153 |

BURHINIDAE

| | |
|---|-----|
| * <i>Burhinus oedicnemus oedicnemus</i> (Linné) | 153 |
| <i>Burhinus vermiculatus vermiculatus</i> (Cabanis) | 153 |

PTEROCLIDIDAE

| | |
|--|-----|
| <i>Pterocles decoratus decoratus</i> Cabanis | 154 |
|--|-----|

COLUMBIDAE

| | |
|---|-----|
| <i>Treron waalia</i> (Meyer) | 154 |
| <i>Treron calva salvadorii</i> (Dubois) | 155 |
| <i>Treron calva wakefieldii</i> Sharpe | 155 |
| <i>Columba arquatrix arquatrix</i> (Temminck) | 155 |
| <i>Streptopelia semitorquata semitorquata</i> (Rüppell) | 155 |
| <i>Streptopelia decipiens perspicillata</i> (Fischer & Reichenow) | 156 |
| <i>Streptopelia capicola tropica</i> (Reichenow) | 156 |
| <i>Aplopelia larvata larvata</i> (Temminck) | 156 |
| <i>Turtur chalcospilos chalcospilos</i> (Wagler) | 156 |
| <i>Tympanistria tympanistria fraseri</i> Bonaparte | 157 |

| | |
|---|------|
| PSITTACIDAE | Page |
| <i>Poicephalus rufiventris rufiventris</i> (Rüppell) | 157 |
| <i>Poicephalus meyeri saturatus</i> Sharpe | 157 |
| MUSOPHAGIDAE | |
| <i>Turacus hartlaubi</i> (Fischer & Reichenow) | 157 |
| <i>Turacus leucolophus</i> (Heuglin) | 158 |
| <i>Musophaga rossae rossae</i> Gould | 158 |
| <i>Corythaecola cristata yalensis</i> (Mearns) | 158 |
| <i>Corythaixoides leucogaster</i> (Rüppell) | 159 |
| CUCULIDAE | |
| <i>Lampromorpha klaasi</i> (Stephens) | 159 |
| <i>Centropus monachus fischeri</i> Reichenow | 159 |
| <i>Centropus superciliosus superciliosus</i> Hemprich & Ehrenberg | 159 |
| TYTONIDAE | |
| <i>Tyto capensis libratus</i> Peters & Loveridge | 160 |
| STRIGIDAE | |
| <i>Strix woodfordii suahelica</i> (Reichenow) | 160 |
| <i>Bubo africanus africanus</i> (Temminck) | 160 |
| <i>Bubo lacteus</i> (Temminck) | 161 |
| CAPRIMULGIDAE | |
| * <i>Caprimulgus europaeus europaeus</i> Linné | 161 |
| * <i>Caprimulgus europaeus meridionalis</i> Hartert | 161 |
| * <i>Caprimulgus europaeus unwini</i> Hume | 161 |
| <i>Caprimulgus nubicus taruensis</i> van Someren | 162 |
| <i>Caprimulgus fossii clarus</i> Reichenow | 162 |
| COLIIDAE | |
| <i>Colius striatus mombassicus</i> van Someren | 163 |
| <i>Colius striatus jebelensis</i> Mearns | 163 |
| TROGONIDAE | |
| <i>Apaloderma narina narina</i> (Stephens) | 163 |
| ALCEDINIDAE | |
| <i>Ceryle rudis rudis</i> (Linné) | 164 |
| <i>Halcyon senegaloides ranivora</i> Meinertzhagen | 164 |
| MEROPIDAE | |
| <i>Melittophagus pusillus cyanostictus</i> (Cabanis) | 164 |
| <i>Melittophagus lafresnayii oreobates</i> Sharpe | 164 |

| CORACIIDAE | | Page |
|---|--|------|
| * <i>Coracias garrulus garrulus</i> Linné | | 165 |
| <i>Coracias caudatus lortii</i> Shelley | | 165 |
| PHOENICULIDAE | | |
| <i>Phoeniculus purpureus marwitzi</i> (Reichenow) | | 166 |
| <i>Phoeniculus bollei jacksoni</i> (Sharpe) | | 166 |
| BUCEROTIDAE | | |
| <i>Bycanistes bucinator</i> (Temminck) | | 166 |
| <i>Bycanistes subcylindricus</i> (Sclater) | | 166 |
| <i>Lophoceros erythrorhynchus erythrorhynchus</i> (Temminck) | | 167 |
| <i>Lophoceros flavirostris flavirostris</i> (Rüppell) | | 167 |
| <i>Lophoceros jacksoni</i> Grant | | 167 |
| <i>Lophoceros melanoleucus geloensis</i> Neumann | | 167 |
| INDICATORIDAE | | |
| <i>Indicator indicator</i> (Sparrman) | | 168 |
| CAPITONIDAE | | |
| <i>Tricholaema lacrymosum lacrymosum</i> Cabanis | | 168 |
| <i>Tricholaema melanocephalum stigmatothorax</i> Cabanis | | 169 |
| <i>Gymnobucco bonapartei cinereiceps</i> Sharpe | | 169 |
| <i>Trachyphonus darnaudii darnaudii</i> (Prévost et Des Murs) | | 169 |
| <i>Trachyphonus darnaudii boehmi</i> Fischer & Reichenow | | 169 |
| PICIDAE | | |
| <i>Campethera nubica pallida</i> (Sharpe) | | 169 |
| <i>Dendropicos fuscescens massaicus</i> Neumann | | 169 |
| <i>Dendropicos fuscescens hemprichii</i> (Ehrenberg) | | 170 |
| <i>Dendropicos lafresnayi lepidus</i> (Cabanis & Heine) | | 170 |
| <i>Yungipicus obsoletus ingens</i> Hartert | | 170 |
| EURYLAEMIDAE | | |
| <i>Smithornis capensis meinertzhageni</i> van Someren | | 170 |
| ALAUDIDAE | | |
| <i>Mirafra poccillosterna massaica</i> (Fischer & Reichenow) | | 170 |
| HIRUNDINIDAE | | |
| * <i>Hirundo rustica rustica</i> Linné | | 170 |
| <i>Hirundo angolensis arcticincta</i> Sharpe | | 171 |
| <i>Hirundo rufula emini</i> Reichenow | | 171 |
| <i>Ptyonoprogne rufigula rufigula</i> (Fischer & Reichenow) | | 171 |

| | |
|---|------|
| CAMPEPHAGIDAE | Page |
| <i>Campephaga quiscalina martini</i> Jackson | 171 |
| <i>Coracina caesia pura</i> (Sharpe) | 172 |
| DICRURIDAE | |
| <i>Dicrurus adsimilis divaricatus</i> (Lichtenstein) | 172 |
| <i>Dicrurus adsimilis fugax</i> Peters | 172 |
| ORIOOLIDAE | |
| * <i>Oriolus oriolus oriolus</i> (Linné) | 172 |
| <i>Oriolus monacha rolleti</i> Salvadori | 173 |
| CORVIDAE | |
| <i>Corvus albus</i> Müller | 173 |
| PARIDAE | |
| <i>Parus albiventris albiventris</i> Shelley | 173 |
| <i>Anthoscopus musculus</i> (Hartlaub) | 174 |
| TIMELIIDAE | |
| <i>Argyra rubiginosa heuglini</i> Sharpe | 174 |
| PYCNONOTIDAE | |
| <i>Pycnonotus tricolor dodsoni</i> Sharpe | 174 |
| <i>Pycnonotus tricolor fayi</i> Mearns | 175 |
| <i>Phyllastrephus sucosus sucosus</i> Reichenow | 175 |
| <i>Phyllastrephus fischeri placidus</i> (Shelley) | 175 |
| <i>Arizelocichla milanjensis strifacies</i> (Reichenow & Neumann) . . | 175 |
| <i>Stelgidocichla latirostris eugenia</i> (Reichenow) | 176 |
| <i>Eurillas virens holochlorus</i> van Someren | 176 |
| TURDIDAE | |
| <i>Turdus olivaceus helleri</i> (Mearns) | 176 |
| <i>Turdus tephronotus</i> Cabanis | 177 |
| * <i>Monticola saxatilis</i> (Linné) | 178 |
| * <i>Oenanthe oenanthe oenanthe</i> (Linné) | 178 |
| * <i>Oenanthe leucomela leucomela</i> (Pallas) | 178 |
| * <i>Oenanthe isabellina</i> (Temminck) | 178 |
| <i>Pinarcchroa sordida rudolphi</i> Madarász | 178 |
| <i>Cossypha heuglini heuglini</i> Hartlaub | 179 |
| <i>Cichladusa guttata rufipennis</i> Sharpe | 179 |
| <i>Pogonocichla margaritifera helleri</i> Mearns | 179 |

| SYLVIIDAE | Page |
|---|------|
| * <i>Sylvia borin</i> (Boddaert) | 179 |
| * <i>Sylvia atricapilla atricapilla</i> (Linné) | 180 |
| * <i>Phylloscopus trochilus trochilus</i> (Linné) | 180 |
| <i>Seicercus ruficapilla minulla</i> (Reichenow) | 180 |
| <i>Seicercus umbrovirens mackenzianus</i> (Sharpe) | 180 |
| <i>Calamonastes simplex simplex</i> (Cabanis) | 181 |
| <i>Apalis flavocincta</i> (Sharpe) | 181 |
| <i>Apalis porphyrolaema porphyrolaema</i> Reichenow & Neumann | 181 |
| <i>Apalis rufifrons rufidorsalis</i> (Sharpe) | 181 |
| <i>Sylvietta brachyura leucopsis</i> (Reichenow) | 181 |
| <i>Sylvietta leucophrys leucophrys</i> (Sharpe) | 181 |
| <i>Eremomela pusilla elgonensis</i> van Someren | 182 |
| <i>Eremomela badiceps turneri</i> van Someren | 182 |
| <i>Camaroptera brevicaudata aschani</i> Granvik | 182 |
| <i>Camaroptera brevicaudata griseigula</i> Sharpe | 182 |
| <i>Cisticola chubbi</i> Sharpe | 183 |
| <i>Cisticola galactotes haematocephala</i> Cabanis | 183 |
| <i>Cisticola troglodytes troglodytes</i> (Antinori) | 183 |
| <i>Melocichla mentalis orientalis</i> (Sharpe) | 184 |
| <i>Prinia mistacea immutabilis</i> van Someren | 184 |
| <i>Prinia mistacea tenella</i> (Cabanis) | 184 |
| <i>Prinia somalica erlangeri</i> Reichenow | 184 |
| <i>Prinia leucopogon reichenowi</i> (Hartlaub) | 184 |
| <i>Prinia bairdii melanops</i> (Reichenow & Neumann) | 185 |
| MUSCICAPIDAE | |
| <i>Alseonax minimus interpositus</i> van Someren | 185 |
| <i>Alseonax minimus murinus</i> Fischer & Reichenow | 185 |
| <i>Bradornis pallidus subalaris</i> Sharpe | 185 |
| <i>Bradornis pallidus suahelicus</i> van Someren | 186 |
| <i>Dioptrornis fischeri</i> Reichenow | 186 |
| <i>Batis molitor puella</i> Reichenow | 186 |
| <i>Batis minor suahelicus</i> Neumann | 186 |
| <i>Platysteira peltata jacksoni</i> Sharpe | 186 |
| <i>Erranornis longicauda teresita</i> (Antinori) | 187 |
| <i>Tchitrea viridis viridis</i> (Müller) | 187 |
| MOTACILLIDAE | |
| * <i>Motacilla cinerea cinerea</i> Tunstall | 187 |
| <i>Anthus sordidus longirostris</i> Neumann | 187 |
| <i>Anthus richardi lacuum</i> Meinertzhagen | 187 |
| * <i>Anthus trivialis trivialis</i> (Linné) | 188 |
| <i>Macronyx croceus croceus</i> (Vieillot) | 188 |

| LANIIDAE | Page |
|---|------|
| <i>Lanius excubitorius princeps</i> Cabanis | 188 |
| <i>Lanius mackinnoni</i> Sharpe | 189 |
| * <i>Lanius collurio</i> Linné | 189 |
| <i>Corvinella corvina chapini</i> Friedmann & Bowen | 189 |
| <i>Laniarius ferrugineus major</i> (Hartlaub) | 189 |
| <i>Laniarius lühderi castaneiceps</i> Sharpe | 189 |
| <i>Dryoscopus affinis</i> (Gray) | 190 |
| <i>Tschagra australis emini</i> (Reichenow) | 190 |
| <i>Tschagra senegala armena</i> (Oberholser) | 190 |
| <i>Tschagra senegala orientalis</i> (Cabanis) | 190 |
| <i>Tschagra jamesi mandana</i> (Neumann) | 190 |
| <i>Rhodophoneus cruentus cathemagmenus</i> (Reichenow) | 191 |
| PRIONOPIDAE | |
| <i>Prionops cristata omoensis</i> Neumann | 191 |
| STURNIDAE | |
| <i>Cinnyricinclus leucogaster verreauxi</i> (Bocage) | 191 |
| <i>Lamprocolius chalybeus sycobius</i> Hartlaub | 192 |
| <i>Lamprocolius splendidus splendidus</i> (Vieillot) | 192 |
| <i>Lamprotornis purpureopterus purpureopterus</i> Rüppell | 192 |
| <i>Onychognathus morio shelleyi</i> (Hartert) | 193 |
| <i>Onychognathus morio ruppellii</i> (Verreaux) | 193 |
| <i>Spreo superbus</i> (Rüppell) | 193 |
| <i>Buphagus erythrorynchus caffer</i> Grote | 193 |
| NECTARINIIDAE | |
| <i>Nectarinia formosa centralis</i> van Someren | 194 |
| <i>Nectarinia kilimensis kilimensis</i> Shelley | 194 |
| <i>Cinnyris bifasciatus tsavoensis</i> van Someren | 194 |
| <i>Cinnyris venustus igneiventris</i> Reichenow | 194 |
| <i>Cinnyris venustus falkensteini</i> Fischer & Reichenow | 195 |
| <i>Cinnyris reichenowi reichenowi</i> Sharpe | 195 |
| <i>Chalcomitra amethystina kalkkreuthi</i> Cabanis | 195 |
| <i>Chalcomitra amethystina doggetti</i> (Sharpe) | 195 |
| <i>Chalcomitra senegalensis aequatorialis</i> (Reichenow) | 195 |
| <i>Chalcomitra verticalis viridisplendens</i> (Reichenow) | 195 |
| <i>Cyanomitra olivacea ragazzii</i> (Salvadori) | 196 |
| <i>Anthreptes collaris ugandae</i> van Someren | 196 |
| ZOSTEROPIDAE | |
| <i>Zosterops virens jacksoni</i> Neumann | 196 |
| <i>Zosterops virens stuhlmanni</i> Reichenow | 197 |
| <i>Zosterops silvanus</i> Peters & Loveridge | 197 |

| PLOCEIDAE | Page |
|--|------|
| <i>Dinemellia dinemelli dinemelli</i> (Rüppell) | 197 |
| <i>Plocepasser mahali melanorhynchus</i> Bonaparte | 198 |
| <i>Passer griseus gongonensis</i> (Oustalet) | 198 |
| <i>Gymnoris pyrgita massaica</i> Neumann | 198 |
| <i>Ploceus insignis insignis</i> (Sharpe) | 198 |
| <i>Ploceus melanogaster stephanophorus</i> (Sharpe) | 198 |
| <i>Ploceus nigricollis nigricollis</i> (Vieillot) | 198 |
| <i>Ploceus nigricollis melanozanthus</i> (Cabanis) | 199 |
| <i>Ploceus bojeri bojeri</i> (Cabanis) | 199 |
| <i>Euplectes nigroventris</i> Cassin | 200 |
| <i>Euplectes capensis xanthomelas</i> Rüppell | 200 |
| <i>Uraeginthus bengalus brunneigularis</i> Mearns | 200 |
| <i>Uraeginthus bengalus ugogoensis</i> Reichenow | 200 |
| <i>Uraeginthus bengalus ugandae</i> Zedlitz | 201 |
| <i>Granatina ianthinogaster ianthinogaster</i> (Reichenow) | 201 |
| <i>Coliuspasser ardens suahelica</i> (van Someren) | 201 |
| <i>Spermophaga ruficapilla ruficapilla</i> (Shelley) | 201 |
| <i>Pytilia melba kirki</i> Shelley | 201 |
| <i>Estrilda astrild nyanzae</i> Neumann | 202 |
| <i>Estrilda nonnula nonnula</i> Hartlaub | 202 |
| FRINGILLIDAE | |
| <i>Poliospiza angolensis reichenowi</i> (Salvadori) | 202 |
| <i>Poliospiza striolata ugandae</i> van Someren | 202 |
| <i>Emberiza flaviventris flaviventris</i> Stephens | 203 |

Systematic Discussion of the Species Collected

PELECANIDAE

PELECANUS RUFESCENS Gmelin

Pelecanus rufescens Gmelin, 1789, Syst. Nat., 1, pt. 2, p. 571: West Africa.

♂ (M. C. Z. 168501) Wema, Tana River, K. C. 11 June 1934.

♀ (M. C. Z. 168502) Golbanti, Tana R., K. C. 23 June 1934.

Native name. Hajowa (Kipokomo).

Parasites. Numerous nematodes (*Contracaecum spiculigerum*) in stomach of ♀.

PHALACROCORACIDAE

HALIËTOR AFRICANUS AFRICANUS (Gmelin)

Pelecanus africanus Gmelin, 1789, Syst. Nat., 1, pt. 2, p. 577: Africa.

♀ (M. C. Z. 168503) Wema, Tana River, K. C. 13 June 1934.

Native name. *Samaluve* (Kipokomo).

Dict. The tadpole of a frog, with hind limbs already developed, was recovered from the stomach of this bird.

ARDEIDAE

ARDEA CINEREA CINEREA Linné

Ardea cinerea Linné, 1758, Syst. Nat., ed. 10, 1, p. 143: Europe. (restricted type locality, Sweden. Cf. Hartert, 1920, Vög. pal. Fauna, 2, p. 1229).

♀ (M. C. Z. 168504) Wema, Tana River, K. C. 14 June 1934.

Dict. Four large shrimps, *Palaemon* (*Parapalaemon*) *dolichodactylus* Hilgendorf, had just been swallowed and were preserved.

Parasites. Three nematodes (*Porrocaecum serpentulus*?) were recovered from the stomach.

CASMERODIUS ALBUS MELANORHYNCHOS (Wagler)

Ardea Melanorhynchus Wagler, 1827, Syst. Av., Addit.: Senegambia.

♂ (M. C. Z. 168505) Wema, Tana River, K. C. 12 June 1934.

Native name. *Nzari* (Kipokomo).

Variation. Bill brownish black, somewhat yellow at the base of the lower mandible. This is the condition described for September in West Africa (Bannermann, 1930, 1, p. 64). Some of the nuptial plumes have been lost and the remainder are somewhat stained and abraded.

Dict. In the stomach was a tadpole and a lungfish (*Protopterus aethiopicus*).

IXOBRYCHUS STURMII (Wagler)

Ardea Sturmii Wagler, 1827, Syst. Av., Ardea sp. 37: Senegambia.

1 egg near Witu, K. C. 2 June 1934.

Native name. *Flangus* (Kipokomo). During the return journey from Lamu to Malindi, the big rains were in full force and the coastal

plains in a semi-flooded state. This was particularly the case in the Tana delta for the river had overflowed its banks.

Frequently one disturbed a small heron feeding about the pools of rainwater lying in one's path, or in the water-logged grass-lands. In size it appeared to me to be about that of *Butorides a. atricapillus* but it struck me as being a species with which I was unfamiliar. I made a note at the time that it was "a bright blue little heron with richly coloured yellow legs which are very conspicuous in flight." In all I flushed a score of these birds but never shot one as I was usually carrying a frogging-net at the time or, if I had my gun, the cartridge held shot too large for so small a bird at close quarters.

Breeding. On May 29, at Mkonumbi, a nest was found in the spiky fronds of a small dom palm, little larger than a bush, growing from knee-deep water in an extensively flooded area. The nest held a single, almost white, egg. Supposing that the clutch consisted of at least two, I left the egg untouched. Returning on the morning of the 30th I observed the bird leave the nest before I was within gunshot, she flew straight away. There was still only one egg. Again I left it, hoping to return, but the arrival of the porters necessitated my leaving for Witu.

On June 2, at Witu, I disturbed one of these herons as I approached a small pond. On going to the spot from which the bird had flown, I found a nest, consisting of a shallow platform of sticks, on the flat branch of a dead mimosa. The nest was two feet above the water and in a very exposed position, the water at this spot was about two feet deep. The nest held one white egg measuring 35 x 26 mm. On close examination a faint bluish tinge can be seen on the shell but nothing like the rich blue shade exhibited by a pair of eggs of *B. a. atricapillus* which I collected at Kilosa on July 7, 1921. These latter measured 34 x 28 mm.

CICONIIDAE

IBIS IBIS (Linné)

Tantalus Ibis Linné, 1766, Syst. Nat., ed. 12, 1, p. 241: Egypt.

♀ ♀ (M. C. Z. 168506-7) Wema, Tana River, K. C. 11 & 15 June 1934.

Native name. Gole (Kipokomo).

Large flocks of Wood Ibis were to be seen feeding in the flooded marshes on either side of the river. During the middle of the day

single birds or small parties might be seen resting in the trees along the banks or in the forests.

ANASTOMUS LAMELLIGERUS LAMELLIGERUS Temminck

Anastomus lamelligerus Temminck, 1823, Pl. Col., livr. 40, pl. 236: Senegal.

♀ (M. C. Z. 168508) Wema, Tana River, K. C. 11 June 1934.

Native name. *Kokola* (Kipokomo).

LEPTOPTILOS CRUMENIFERUS (Lesson)

Ciconia crumenifera Lesson, 1831, *Traité d'Orn.*, livr. 8, p. 585: Senegal.

♀ (M. C. Z. 168509) Western foot of Mt. Debasien, U. 16 November 1933.

Native name. *Achulutu* (Karamojo).

Breeding. This bird was shot as it circled overhead, it planed for half-a-mile and was picked up dead with an S. S. G. bullet in its chest. The oviduct held one large egg still lacking a shell but measuring 74 x 53 mm.; in addition there were four others, spherical in shape and measuring 40 mm., 35 mm., 28 mm. and 20 mm. respectively.

On November 23, I was descending a ravine on the mountain at a point about two flight miles distant from where I had shot the bird. As we approached an enormous *mvuli* (*Chlorophora sp.*) tree growing in this ravine we were momentarily startled by a deep grunting note. It was something like the warning call of a guereza, something like the moo-moo of a cow. My gunbearer remarked: "A coward, hearing that would probably suppose that it was a lion and run away." On the noise being repeated I traced it to a colony of marabou which were nesting in the *mvuli*. About six birds were distinguished, they were sitting or standing on their relatively small nests; the latter were widely scattered and not easy to detect among the dense foliage at such a height. The position of the tree in relation to sea level was in the neighbourhood of 4,500 feet.

THRESKIORNITHIDAE

THRESKIORNIS AETHIOPICA AETHIOPICA (Latham)

Tantalus aethiopicus Latham, 1790, *Ind. Orn.*, p. 706: "Aethiopia" = Egypt.

Native name. The Sacred Ibis is known as *Nyenge* to the Wapokomo.

HAGEDASHIA HAGEDASH NILOTICA Neumann

Hagedashia hagedash nilotica Neumann, 1909, Ornith., **13**, p. 193: Kimo, north-west of Addis Ababa, Ethiopia.

♀ (M. C. Z. 168510) Mt. Debasien, U. 16 November 1933.

Corrigenda. The bird from Mwaya, Lake Nyasa, identified as *nilotica* by Bangs and Loveridge (1933, p. 148) is not adult. It should, therefore, probably be referred to *H. h. erlangeri* Neumann.

Distribution. Granvik (1934, p. 4) has recorded this form from the western slopes of Mt. Elgon where he found it uncommon. At my camp at 5,000 feet on the western slopes of Mt. Debasien, the noisy cries of the Nile Valley Hadadas were a familiar sound at dawn; they were then apparently returning from their fishing grounds. The bird that was shot had been fishing in the Amaler River.

Dict. Its stomach held much mud and the remains of crabs.

ANATIDAE

SARKIDIORNIS MELANONOTA (Pennant)

Anser melanonotos Pennant, 1769, Indian Zoöl., p. 12, pl. xi: Ceylon.

♂ (M. C. Z. 168511) Wema, Tana River, K. C. 19 June 1934.

ANAS SPARSA LEUCOSTIGMA Rüppell

Anas leucostigma Rüppell, 1845, Syst. Uebers. Vög. N.-O. Afr., pp. 130, 138, pl. xlviii: Abyssinia (i.e. Ethiopia).

♂ ♀ (M. C. Z. 168512-3) Sipi, w. Mt. Elgon, U. 15 December 1933.

Native names. *Tarratetabe* (Kisebei); *Liduvu* (Lugishu).

Breeding. On December 11, the evening of the day of my arrival at Sipi, two Black Duck flew past, one carrying a piece of sedge or grass in its bill. On the 15th, a native brought in alive this pair of birds which he had snared. To prevent their escape, he had cruelly broken their wings and a leg. I purchased and chloroformed them immediately, refusing to buy any more birds during my stay.

The following day a youngster brought in a duck egg. Supposing it to be a domestic product, I paid little attention to him, referring him to the cook who purchased for the commissariat. Next morning a couple of eggs were served up for breakfast, but on opening them feathered ducklings were found within. On enquiry, I then learned

that the vendor of the duck's egg had later produced six more, and that he was the same lad who had brought in the ducks. It seems probable, therefore, that the seven eggs represented a clutch and that the birds brought to me had been snared at their nest. If so, it furnishes further evidence of the destruction of bird life involved in purchasing from natives.

ANAS PUNCTATA PUNCTATA Burchell

Anas punctata Burchell, 1822, Travels, **1**, p. 283, note: Zak River, Cape Province.

♂ (M. C. Z. 168514) Karawa, near Malindi, K. C. 26 June 1934.

This bird was one of a flock of a dozen paddling and feeding on shallow, extensively flooded flats; two other parties of less than half-a-dozen duck were seen. If van Someren (1930, p. 63) is correct in supposing that Hottentot Teal nest in Kenya in May and June, then it looks as if these birds had already reassembled in flocks.

ACCIPITRIDAE

ELANUS CAERULEUS CAERULEUS (Desfontaines)

Falco caeruleus Desfontaines, 1789 (1787), Hist. (Mém.) Acad. Paris, p. 503, pl. xv: Algiers.

♀ (M. C. Z. 168515) Kaimosi, K. C. 23 February 1934.

Breeding. Non-breeding bird in immature plumage with stomach empty.

MILVUS MIGRANS PARASITUS (Daudin)

Falco parasitus Daudin, 1800, Traité d'Orn., **2**, p. 150: South Africa, *ex* Levallant.

♂ (M. C. Z. 168516) Karita River, Suk, U. 9 November 1933.

♂ ♀ (M. C. Z. 168517-8) Mt. Debasien, U. 17 November 1933.

Native names. *Chuli* (Karamojo), *Gisirire* (Lugishu).

Variation. The pair from Mt. Debasien were killed by a single shot as they sat together in a tree. The ♀ is immature with horny-black bill quite unlike the yellow bills of the adults. In coloration also she is much more rufous; particularly about the head as described by

Granvik (1934, p. 7) for Mt. Elgon birds. The wing measurements are as follows: — ♂♂ 425 mm., 430 mm. ♀ 409 mm.

Dict, etc. When descending the mountain on the morning of November 7, I found many scores of kites in the trees in the vicinity of the abandoned Karamojong village. So numerous were they that every large tree in the vicinity held birds, as many as five and six to a tree. They appeared to be resting in enjoyment of the early sunshine. As they were not there on the previous evening, it seems possible that they had been attracted to the district by extensive grass fires which had been raging on the plain 1,200 feet below. The only food found in their stomachs, however, was a large green scarab in that of the male.

MELIËRAX MUSICUS POLIOPTERUS Cabanis

Melierax poliopterus Cabanis, 1869, in von der Decken, Reise, 3, Abth. 1, p. 40: Umba River, East Africa (Kenya-Tanganyika boundary).

♀ (M. C. Z. 168519) Kitau, Manda Island, K. C. 19 May 1934.

Dict, etc. Shortly after daybreak I was attracted by the warning cries of baboons (*Papio ibeanus*) such as they make when they have discovered a leopard. I followed them up into very dense bush but they kept retiring so that I did not even get a glimpse of them. At the spot where they had been, however, a persistent mewing drew my attention to this Chanting Hawk which was perched on the summit of a wide-spreading acacia. The bird continued calling, undeterred by my arrival or the preceding commotion. In the tree as well as in an adjacent one were large hawk nests, but both were empty. On examining the stomach of the hawk, I found it crammed, even at this early hour, with locust-like grasshoppers of a species of which I had collected a series at Lamu.

MELIËRAX METABATES METABATES Heuglin

Melierax metabates Heuglin, 1861, Ibis, p. 72: White Nile between 6° and 7° N. lat.

♂ (M. C. Z. 168520) Mt. Debasien, U. 29 November 1933

Breeding. Granvik (1934, p. 12) found this species breeding on July 14 at Lotonok; he also collected the White Nile Chanting Hawk at Kacheliba and Kolosia in the vicinity of Mt. Debasien.

Dict. A striped rat (*Lemniscomys striatus massaicus*), remains of another rodent, also a striped skink (*Mabuya striata*) were recovered from the stomach of this bird.

BUTEO RUFOFUSCUS AUGUR (Rüppell)

Falco (Buteo) Augur Rüppell, 1836, Neue Wirbelth., Vög., p. 38, pl. xvi: Ethiopia.

♂ ♀ ♀ (M. C. Z. 168521-3) Kaburomi, Mt. Elgon, U. 28-30 December 1933.

♂ juv. (M. C. Z. 168524) Kirui, s. Mt. Elgon, K. C. 24 January 1934

Native names. *Nabuye* for white phase, *yamale* for melanistic birds (Lugishu).

Variation. The adult ♀ from Kaburomi has the underparts entirely deep black and the paler portions of the back and interscapular area also black. See Granvik (1934, p. 10) for further occurrence of melanism in Elgon birds.

Breeding. On January 23, I watched a young Augur Buzzard float down from the crags above Kemp's Cave to the valley below—evidently its first attempted flight. My local gunbearer urged me to shoot it but I refused. Next day it was brought up the mountain by a native who had killed it.

Diet. The stomach contents of the three Kaburomi birds were:—(1) Swamp rat (*Otomys tropicalis elgonis*) and Variable Skink (*Mabuya v. varia*). (2) Five skinks (*M. v. varia*) and four chameleons (*C. bitaeniatus altaeclgonis*). (3) A chameleon (*C. b. altaeclgonis*).

Habitat. Augur Buzzards were quite the commonest large birds in the alpine meadow zone. They frequent the cliffs just below Jackson's Summit (13,650 feet). Nearby four buzzards were seen dashing at each other in the air, eventually two went off, evidently driven away by the others.

Parasites. Lice (*Laemobothrion titan*) were abundant on the fledgling.

BUTEO VULPINUS VULPINUS (Gloger)

Falco vulpinus "Licht." Gloger, 1833, Das Abändern der Vögel, p. 141: Africa.

♀ (M. C. Z. 168525) Elgoni, Mt. Elgon, K. C. 30 January 1934.

KAUPIFALCO MONOGRAMMICUS (Temminck)

Falco monogrammicus Temminck, 1824, Pl. Col., livr. 53, pl. cccxiv: Senegal.

♂ ♂ (M. C. Z. 168526-7) Bukori, Kitosh, K. C. 18 January 1934.

♂ ♀ (M. C. Z. 168528-9) Voi, Seyidie Prov., K. C. 7 & 11 April 1934.

Native name. *Sichit* (Masai).

Variation. On laying out the series of twenty-two skins of the Lizard-Buzzard in the collection of the Museum of Comparative Zoölogy, we fail to discover any constant characters to separate forms though the series covers practically all parts of the range.

In size, males of the southern and eastern birds (including Uganda), range from 204–214 mm. in wing measurements. Males of the western (Cameroon and Portuguese Guinea) birds range from 202–216 mm. Females of the eastern birds are from 211–222 mm., of the western 215–236 mm.

The two skins from the arid thorn-bush region of Voi are noticeably paler than the pair of birds from the almost equally dry Kitosh country which, however, is adjacent to the forested slopes of Mount Elgon. One of these Bukori birds is the darkest in the whole series but the other is no darker than specimens from elsewhere.

We find ourselves, therefore, in entire agreement with the conclusions reached by Claude Grant and Mackworth-Praed (1934, p. 130).

Diet. Mouse fur in stomach of one Bukori bird. A young chameleon (*C. d. roperi*) and remains of many grasshoppers in the ♂ from Voi; a spiny mouse (*Acomys ignitus*) in the ♀ from this locality.

Enemies. Both Bagishu and Jaluó eagerly eat these birds but they are scorned by the Karamojong.

BUTASTUR RUFIPENNIS (Sundevall)

Poliornis rufipennis Sundevall, 1851 (1850), Öfv. K. Vet.-Akad. Förh., 7, p. 131; Near Khartoum.

♀ (M. C. Z. 168530) W. foot of Mt. Debasien, U. 2 December 1933.

Besides an old skin from the Lafresnaye collection and a pair from Morogoro, Tanganyika Territory, collected by Loveridge in 1918, no other examples of the rare Grasshopper-Buzzard have been received by the Museum. Van Someren (1922, p. 42) mentions a skin from Singo, Uganda as well as some of Loveridge's Morogoro series.

LOPHAËTUS OCCIPITALIS (Daudin)

Falco occipitalis Daudin, 1800, *Traité d'Orn.*, 2, p. 40: Antiquoi Country. (*i.e.* Knysna Dist., Cape Province, *apud* Selater).

♂ (M. C. Z. 168531) Elgonyi, Mt. Elgon, K. C. 5 February 1934.

♂ (M. C. Z. 168532) Kaimosi, Kakamega, K. C. 21 February 1934.

Diet. A rat (*Arvicanthis a. nubilans*) was in the stomach of the Crested Eagle from Kaimosi.

AQUILA WAHLBERGI Sundevall

Aquila Wahlbergi Sundevall, 1851 (1850), Öfv. K. Vet.-Akad. Förh., 7, p. 109: "Caffraria superiori, prope 25° lat." (Type from Mohapoani Berg, Bechuanaland.)

♂ (M. C. Z. 168533) Voi, K. C. 10 April 1934.

Diet. In addition to the feet and feathers of a big bird, the stomach of this Wahlberg's Eagle held half-a-dozen large grasshoppers.

HALIAEETUS VOCIFER CLAMANS C. L. Brehm

Haliaeetus clamans C. L. Brehm, 1853, Journ. f. Orn., 1, p. 199, note: No definite locality. (Shoa, Ethiopia designated by Friedmann).

♂ (M. C. Z. 168534) Mt. Debasien, U. 16 November 1933.

♂ (M. C. Z. 168535) Tana River nr. Ngau, K. C. 21 June 1934:

Native names. *Egwele* (Karamojong); *Chalipoko* (Kipokomo).

Variation. For designation of the type locality and discussion on the Northern Fish Eagle see Friedmann (1930, p. 66), also Bannermann (1930, p. 268) and van Someren (1932, p. 269).

The wings of these two males, when pressed down on the ruler, measure 498 and 511 mm. respectively. They are, therefore, considerably smaller than our series of the typical form from near Mwanza, Lake Victoria and Ujiji, Lake Tanganyika. These give 540-563 mm. for three adult males, 565 mm. for an adult female.

From the measurements that he gives, it would seem that the birds from Rhino Camp, west Nile, referred to the typical form by Friedmann, should rather be relegated to *clamans*. This would be in conformity with Bannermann's remarks on the ranges of the forms. It would also appear that the birds from Kenya and Uganda listed by Friedmann as *v. vocifer* are in reality somewhat intermediate between the typical form and *clamans*.

Diet. The Debasien bird was in a tree in dry bush at an altitude of 4,500 feet when I shot it at sunset. A most unexpected place for this riverine and lake-haunting bird. Still more astonishing was the statement of my Mgishu skinner who avowed that its stomach held termites!

Parasites. These birds were shot in the hope of obtaining the peculiar hippoboscoid fly which has been described from it. None were found on either though lice were plentiful enough on the Ngau bird after its recovery from the river into which it fell when shot.

Folklore. Wapokomo women wear a claw of the Northern Fish Eagle dependent from their waist to insure fertility or an easy delivery.

NECROSYRTES MONACHUS PILEATUS (Burchell)

Vultur pileatus Burchell, 1824, *Travels*, 2, p. 195, note: Hopetown District, Cape Province.

♂ ♂ imm, 1 unsexed (M. C. Z. 168536-8) Mt. Debasien, U. 2 December 1933.

Habitat. The Southern Hooded Vulture was common on the plains at the western foot of the mountain as well as in the vicinity of our camp (5,000 feet). According to Granvik (1923, p. 65; 1934, p. 5) the species is common on Mt. Elgon at 7,500 feet.

*CIRCUS MACROURUS (S. G. Gmelin)

Accipiter macrourus S. G. Gmelin, 1771 (1770), *Nov. Comm. Acad. Petrop.*, 15, p. 439, pls. viii & ix: Voronezh, southern Russia.

♀ (M. C. Z. 168539) Madangi, Mt. Elgon, U. 4 January 1934.

♀ (M. C. Z. 168540) Bukori, Kitosh, K. C. 18 January 1934.

♀ ♀ (M. C. Z. 168541-2) Kaimosi, K. C. 12 February and 3 March 1934.

Dict. Rodent fur in the stomachs of the Bukori and a Kaimosi bird, a swamp rat (*Otomys a. classodon*) in the juvenile Kaimosi harrier.

*CIRCAËTUS GALLICUS GALLICUS (Gmelin)

Falco gallicus Gmelin, 1788, *Syst. Nat.*, 1, p. 259: France

♀ (M. C. Z. 168543) w. foot Mt. Debasien, U. 2 December 1933.

This is very definitely the European bird and not *C. g. pectoralis*.

Dict. Its stomach held a green snake (*Chlorophis neglectus*).

Parasites. Among its feathers were hippoboscid flies (*Lynchia* sp.).

CIRCAËTUS FASCIOLATUS Gurney

Circaëtus fasciolatus Gurney, 1861, *Ibis*, p. 130: (Natal, ex Gray, 1848, *List Bds. Brit. Mus.*, p. 18, where a *nomen nudum*).

♂ (M. C. Z. 168544) Ngatana, Tana River, K. C. 13 June 1934.

Native name. Kifoanzongo (Kipokomo).

Variation. Our material is too scanty to give a definite opinion, but it would appear as if *cincrasceus* of South Africa is conspecific. The only other example of this rare Banded Harrier-Eagle in the

Museum is a ♀ collected by Loveridge near Mkindo River, central Tanganyika Territory, September 7, 1921.

Diet. The stomach of the Ngatana bird held two snakes (*Boaedon lineatus* and *Philothamnus s. semivariatus*).

FALCONIDAE

POLIOHIERAX SEMITORQUATUS DECKENI Zedlitz

Poliohierax semitorquatus deckeni Zedlitz, 1914, Journ. f. Orn., **62**, p. 675: Southern Somaliland.

♂ (M. C. Z. 168545) Tsavo, K. C. 5 April 1934.

Affinities. This Pigmy Falcon, erroneously sexed ♀ by the native skinner, is obviously a male by its gray back. Our material is insufficient to assist in arriving at a decision as to whether two or four races can be recognized. The wing measurement of this bird is 115 mm. so that both on size and locality it should be referable to *deckeni* as defined by Bowen (1931, pp. 257-262).

*FALCO TINNUNCULUS TINNUNCULUS Linné

Falco Tinnunculus Linné, 1758, Syst. Nat., ed. 10, p. 90: Europe (restricted type locality, Sweden, *apud* Hartert).

1 (M. C. Z. 168546) Madangi, U. 2 January 1934.

♀ (M. C. Z. 168547) Kaimosi, K. C. 12 February 1934.

Native name. *Nabuho* (Lugishu).

Diet. A Variable Skink (*Mabuya v. varia*) in stomach of Madangi bird. It was a common sight to see these European Kestrels hovering over the alpine meadows of Mount Elgon at 12,000 feet. Doubtless in this region the numerous skinks furnish them with an abundance of food. The ♀ held a Pigmy Mouse (*Leggada b. bella*) and locusts in its stomach.

FALCO TINNUNCULUS CARLO (Hartert & Neumann)

Cerchneis tinnunculus carlo Hartert & Neumann, 1907, Journ. f. Orn., **55**, p. 592: Bissidimo, near Harrar, Ethiopia.

♂ (M. C. Z. 168548) w. slopes Mt. Debasien, U. 18 November 1933.

Corrigenda. This Mountain Kestrel has been compared with the Ujiji series (Bangs & Loveridge, 1933, p. 149) since studied by Claude Grant and Mackworth-Praed (1934, p. 79) who consider that the pale

male (M. C. Z. 148228) shot in company with the Mountain Kestrels, is really an immature example of the Egyptian Kestrel (*F. t. rupicolaeformis*) on migration.

Diet. Shot while chasing a small bird around a stockade fence; its stomach held locusts and grasshoppers.

PHASIANIDAE

FRANCOLINUS SEPHAENA GRANTII Hartlaub

Francolinus grantii Hartlaub, 1866 (1865), Proc. Zoöl. Soc. London, p. 665, pl. xxxix, fig. 1: Unyamwezi, Tanganyika Territory.

- ♂ (M. C. Z. 168549) Karita River, Suk, U. 9 November 1933.
 ♂ ♂ ♀ ♀ (M. C. Z. 168550-3) s. bank Greeki River, U. 4 December 1933.
 ♂ ♂ (M. C. Z. 168554-5) Voi, K. C. 12 April 1934.
 ♂ ♂ (M. C. Z. 168556-7) Kitau, Manda Id., K. C. 16 & 18 May 1934.
 ♂ (M. C. Z. 168558) Golbanti, Tana R., K. C. 25 June 1934.

Variation. In the series from Greeki River alone, we note a variation of 10 mm. in the wing length of the males. In so far as they relate to *grantii*, our material bears out the conclusions of Claude Grant and Mackworth-Praed (1934, pp. 170-1).

FRANCOLINUS CLAPPERTONI GEDGII Ogilvie-Grant

Francolinus clappertoni gedgii Ogilvie-Grant, 1891, Ibis, p. 124: Plains near Mount Elgon.

- ♀ (M. C. Z. 168559) w. foot Mt. Debasien, U. 20 November 1933.
 ♀ ♀ ♀ (M. C. Z. 168560-2) n. bank Greeki River, U. 5-6 December 1933.
 ♀ (M. C. Z. 168563) s. bank Greeki River, U. 7 December 1933.

The Greeki River birds are topotypes of this race, and their habits as observed on the plains through which the river flows agree well with those noted by van Someren (1926, p. 51).

FRANCOLINUS HILDEBRANDTI HILDEBRANDTI Cabanis

Francolinus (Scleroptera) Hildebrandti Cabanis, 1878, Journ. f. Orn., **26**, pp. 206, 243, pl. iv, fig. 2: Voi, Taita district, Kenya Colony.

- ♀ (M. C. Z. 168564) Voi, K. C. 12 April 1934.

FRANCOLINUS SQUAMATUS ZAPPEYI Mearns

Francolinus schuetti zappeyi Mearns, 1911, Smiths. Misc. Coll., **56**, no. 20, p. 4: East shore of Lake Victoria, Kenya Colony.

♀ (M. C. Z. 168565) Kaimosi, K. C. 17 February 1934.

This bird is almost topotypic, Kaimosi being fifty miles northeast of the lake.

PTERNISTIS AFER LEUCOPARAEUS (Fischer & Reichenow)

Francolinus (Pternistes) leucoparaeus Fischer & Reichenow, 1884, Journ. f. Orn., **32**, p. 263: Kipini, at the mouth of the Tana River, Kenya Colony.

♂ (M. C. Z. 168566) Golbanti, K. C. 23 June 1934.

Golbanti is about twenty-five miles in a straight line from the type locality, Kipini, which is actually at the mouth of the Ozi, branch of the Tana River.

Variation. Van Someren (1925, p. 95) is definitely wrong in stating that the cheeks of the adult are black. Not only in the original description are they stated to be white, but in our almost topotypic bird they are feathered white.

NUMIDIDAE

NUMIDA MELEAGRIS MAJOR Hartlaub

Numida pitlorhyncha var. *major* Hartlaub, 1884 (1883), Abh. naturwiss. Ver. Bremen, **8**, p. 217: Wakkala, in the Bari country near Gondokoro.

♂ ♀ (M. C. Z. 168567-8) Mt. Debasien, U. 21-22 November 1933.

♂ ♂ ♀ ♀ (M. C. Z. 168569-72) n. bank Greeki River, U. 5-6 December 1933.

♂ ♂ ♂ (M. C. Z. 168573-5) s. bank Greeki River, U. 7 December 1933.

♀ (M. C. Z. 168576) Elgonyi, K. C. 1 February 1934.

Distribution. The Debasien birds were shot at the very edge of the rain forest at 7,000 feet, the Elgonyi bird on the deforested hillside at 7,000 feet. The north bank of the Greeki River is in Karamojo, the south bank in the Sabei country. The Uganda Tufted Guineafowl were in the habit of roosting in the big trees and scattered clumps of acacia which fringed the river banks.

GUTTERA EDOUARDI SETHSMITHI Neumann

Guttera cristata seth-smithi Neumann, 1908, Bull. Brit. Orn. Club, **23**, p. 13:
Budongo Forest, Unyoro, Uganda.

♂ ♀ (M. C. Z. 168577-8) Elgoni, K. C. 5 February 1934.

♂ ♀ (M. C. Z. 168579-80) Kaimosi, K. C. 26 February 1934.

RALLIDAE

LIMNOCORAX FLAVIROSTRA (Swainson)

Gallinula flavirostra Swainson, 1837, Birds of West Africa, **2**, p. 244, pl. xxviii: Senegal.

Nest and 3 eggs near Witu, K. C. 2 June 1934,

Breeding. It should be stated that a Black Crake was not seen to leave this nest but birds of this species were seen within a quarter of a mile of the rain-formed pool in which the nest was situated. The eggs are a shade larger than the largest in Pitman's fine series.

The nest, roughly measuring 180 x 150 mm. across and 60 mm. in outside depth, was entirely composed of dry sedges and placed in the centre of a clump of fresh green sedges growing in knee-deep water. It held three fresh eggs, measuring 36 x 23 mm., of a buffy white ground color slightly tinged with pink; the whole more or less uniformly flecked with small dots or dashes of pale brown and pale violet.

SAROTHRURA RUFA ELIZABETHAE van Someren

Sarothrura rufa elizabethae van Someren, 1919, Bull. Brit. Orn. Club, **40**, p. 20: Kakamegoes, Kavirondo ♂, and Kisumu ♀, Kenya Colony.

7 ♂, 3 ♀ (M. C. Z. 168581-90) Kaimosi, K. C. 10-23 February 1934.

Distribution. These skins are practically topotypes as Kaimosi is an outlyer of the Kakamega forest. The series compares very well with the male from Mkarazi (not Mkaraji as spelt by Friedmann, 1928, p. 76) Uluguru Mountains, Tanganyika Territory in the collection.

SAROTHRURA PULCHRA CENTRALIS Neumann

Sarothrura pulchra centralis Neumann, 1908, Bull. Brit. Orn. Club, **21**, p. 45: Mswa, west shore of Lake Albert.

3 ♂ (M. C. Z. 168591-3) Kaimosi, K. C. 9-13 February 1934.

It is interesting to find three species of *Sarothrura* occurring in the same locality. All were carefully snared by the same native.

SAROTHRURA ELEGANS REICHENOWI (Sharpe)

Corethrura reichenowi Sharpe, 1894, Cat. Bds. Brit. Mus., **23**, p. 121: Cameroon (= Buea, Cameroon Mt., ex Reichenow, 1892, Journ. f. Orn., p. 178).

♂ (M. C. Z. 168594) Kaimosi, K. C. 26 February 1934.

Affinities. This bird constitutes the first record for Kenya Colony. In default of adequate comparative material we follow van Someren (1922, p. 23) in referring it to *reichenowi* though it would seem possible that Uganda and Kenya birds may belong to an undescribed race.

CHARADRIIDAE

HOPLOPTERUS SPINOSUS (Linné)

Charadrius spinosus Linné, 1758, Syst. Nat., ed. 10, **1**, p. 151: Egypt.

♂ ♀ (M. C. Z. 168595-6) Wema, Tana River, K. C. 13-18 June 1934.

Native name. Tirangole (Kipokomo).

CHARADRIUS PECUARIUS PECUARIUS Temminck

Charadrius pecuarius Temminck, 1823, Pl. col., livr. 31, pl. clxxxiii: Cape of Good Hope.

♂ (M. C. Z. 168597) Kitau, Manda Id., K. C. 17 May 1934.

BURHINIDAE

*BURHINUS OEDICNEMUS OEDICNEMUS (Linné)

Charadrius Oedicnemus Linné, 1758, Syst. Nat., ed. 10, **1**, p. 151: England.

♂ (M. C. Z. 168598) N. bank of Greeki River, U. 5 December 1934.

BURHINUS VERMICULATUS VERMICULATUS (Cabanis)

Oedicnemus vermiculatus Cabanis, 1868, Journ. f. Orn., **16**, p. 413: No locality given (= Lake Jipe, near Taita, Kenya Colony).

♂ ♀ ♀ (M. C. Z. 168599-601) Wema, Tana River, K. C. 19 June 1934.

Both females are young birds and were killed on a sandbar exposed by a fall in the river.

PTEROCLIDIDAE

PTEROCLES DECORATUS DECORATUS Cabanis

Pterocles decoratus Cabanis, 1868, Journ. f. Orn., **16**, p. 413: No locality given
(= Lake Jipe, near Taita, Kenya Colony).

♂ (M. C. Z. 168602) Tsavo, K. C. 31 March 1934.

Tsavo is only seventy miles northeast of the type locality.

COLUMBIDAE

TRERON WAALIA (Meyer)

Columba waalia F. A. A. Meyer, 1793, Syst.-Sum. Uebers. Zoöl. Entdeck.,
p. 128: Tcherkin, near Lake Tsana, Ethiopia.

♂ ♂ ♀ (M. C. Z. 168603-5) Mt. Debasien, U. 20 & 25 November 1933.

Variation. There is little doubt but that with adequate series from different parts of the range of the species, at least one geographical race will have to be separated. We refrain from doing so for two reasons, the first is insufficiency of our material, particularly from West Africa; the second, lack of topotypical material of *cinereiceps* Neumann (Journ. f. Orn., **52**, 1904, p. 341: middle Gelo River, Jamboland). The wings of four males from the Ethiopian highlands (Lake Tana and Hawash districts) measure 174-186 mm.

Our two males from Mount Debasien and three more from Kenya and Uganda in the British Museum, measured for us by Mr. C. H. B. Grant, give 159-178 mm., a male from the Dindar River, eastern Sudan, has a wing of 162 mm., but this measurement is not full since the bird is in molt and the second longest primary is not yet grown out, the measurement is therefore to the tip of the outer primary which is worn. A male and an unsexed bird from British Somaliland have wings measuring 171 and 174 mm. respectively, and an unsexed bird from West Africa, 172 mm.

A female from the Hawash district has a wing 174 mm., our Debasien bird 161, and two from the Upper Blue Nile 159-163 mm., but as in the Dindar River male the state of their primaries prevents measurements of full value.

While it appears likely that there is a smaller race in Kenya, Uganda and perhaps the Sudan and western Ethiopia, we are by no means certain that Neumann's name really applies to it, the status of the

Somaliland and West African birds cannot be settled, but we hope that the information given here may enable some future investigator to clear up the question.

We do not believe that the African green fruit pigeons (*Vinago*) merit generic separation from the Indo-Malayan species (*Treron*).

TRERON CALVA SALVADORII (Dubois)

Vinago salvadorii Dubois, 1897, Proc. Zool. Soc. London, p. 784: Eastern and central tropical Africa (restricted to the western shores of Lake Tanganyika by Hartert and Goodson).

♂ ♂ ♀ (M. C. Z. 168606-8) Mt. Debasien, U. 16-30 November 1933.

♂ (M. C. Z. 168609) Nyenye, U. 8 December 1933.

♀ (M. C. Z. 168610) Kaimosi, K. C. 26 February 1934.

TRERON CALVA WAKEFIELDII Sharpe

Treron wakefieldii Sharpe, 1874 (1873), Proc. Zool. Soc. London, p. 715, pl. lviii, fig. 2: Mombasa, Kenya Colony.

♂ ♀ (M. C. Z. 168611-2) Wema, Tana River, K. C. 20 June 1934.

Affinities. We follow Grote (1931, p. 140) in considering *wakefieldii* only subspecifically distinct from the gray-tailed *calva* group. We are not, however, quite prepared to accept his view that all the mainland forms should be regarded as subspecies of the Malagasy *australis*.

COLUMBA ARQUATRIX ARQUATRIX Temminck

Colomba (sic) arquatrix Temminck, 1809, in Knip, Les Pigeons, les Colombes, p. 11, pl. v: South Africa-Anteniquoi country (*i.e.* Knysna Dist., Cape Province, *apud* Selater).

♂ ♂ (M. C. Z. 168613-4) Mt. Debasien, U. 22 & 27 November 1933.

Shot in the rain forest at 7,000 feet. Recorded from Mount Elgon by Granvik (1934, p. 19).

STREPTOPELIA SEMITORQUATA SEMITORQUATA (Rüppell)

Columba semitorquata Rüppell, 1837, Neue Wirbelth., Vog., p. 66, pl. xxiii, fig. 2: Tarentola Mountains, Ethiopia.

♀ (M. C. Z. 168615) Butandiga, U. 31 January 1934.

♂ (M. C. Z. 168616) Elgonyi, K. C. 30 January 1934.

Variation. We agree with Friedmann (1930, p. 216) that the characters claimed for *elgonensis* Granvik, based on a female from

the eastern slopes of the mountain at 7,000 feet, are individual, and that our birds from the west (6,000 feet) and south (7,000 feet) do not substantiate them.

STREPTOPELIA DECIPIENS PERSPICILLATA (Fischer & Reichenow)

Turtur perspicillata Fischer & Reichenow, 1884, Journ. f. Orn., **32**, p. 179: Nguruman, Masailand, Tanganyika Territory.

♂ (M. C. Z. 168617) Voi, K. C. 10 April 1934.

Variation. This bird has a wing length of 142 mm. which places it as a *capicola*. On the other hand its cheeks are distinctly pale gray which is one of the principal characters relied upon for distinguishing the *decipiens* group from *capicola*. In its coloration it closely resembles a bird from Kabare, Bukoba which, according to Friedmann (1930, p. 221) is within the range of *decipiens permista*. It in no way resembles specimens attributed to *perspicillata* from Shinyanga, Usukuma and Kisumu, Kavirondo.

STREPTOPELIA CAPICOLA TROPICA (Reichenow)

Turtur capicola tropica Reichenow, 1902, Orn. Monatsb., **10**, p. 139. East Africa (Type from Songea, Tanganyika Territory).

♂ ♂ (M. C. Z. 168618-9) Mt. Debasien, U. 22 & 29 November 1933.

Previously recorded from Kacheliba and Mount Elgon by Granvik (1934, p. 21).

APLOPELIA LARVATA LARVATA (Temminck)

Columba larvata Temminck, 1810, in Knip, Les Pigeons, les Colombes, p. 71, pl. xxxi; Anteniquoi (*i.e.* Knysna Dist., Cape Province, *apud* Slater).

♀ (M. C. Z. 168620) Mt. Mbololo, K. C. 19 April 1934.

TURTUR CHALCOSPILOS CHALCOSPILOS (Wagler)

Columba Chalcospilos Wagler, 1827, Syst. Av., Columba, sp. 83: South Africa (= Eastern Cape Province).

♂ (M. C. Z. 168621) Elgonyi, K. C. 24 January 1934.

♂ (M. C. Z. 168622) Kibwezi, K. C. 24 March 1934.

♀ (M. C. Z. 168623) Kitau, Manda Id., K. C. 17 May 1934.

TYMPANISTRIA TYMPANISTRIA FRASERI Bonaparte

Tympanistria fraseri Bonaparte, 1855 (after April 15), Consp. Av., 2, p. 67: Fernando Po.

♂ (M. C. Z. 168624) Sipi, U. 12 December 1933.

PSITTACIDAE

POICEPHALUS RUFIVENTRIS RUFIVENTRIS (Rüppell)

Pionus rufiventris Rüppell, 1845, Syst. Uebers., p. 83, pl. xxxii: Shoa, Ethiopia.

♂ ♀ (M. C. Z. 168625-6) Tsavo, K. C. 4 April 1934.

Affinities. In the absence of any typical Ethiopian material, we follow Friedmann (1930, p. 291) in referring these birds to the typical form and regarding *simplex* Reichenow of Tanganyika as a synonym.

POICEPHALUS MEYERI SATURATUS (Sharpe)

Poecocephalus saturatus Sharpe, 1901, Bull. Brit. Orn. Club, 11, p. 67: Northern Ankole, Uganda.

♀ (M. C. Z. 168627) Bukori, K. C. 18 January 1934.

Affinities. This race has been discussed at length by Granvik (1923, p. 74 and 1934, p. 29) who obtained good series on the east and northeast of Mt. Elgon.

MUSOPHAGIDAE

TURACUS HARTLAUBI (Fischer & Reichenow)

Corythaix hartlaubi Fischer & Reichenow, 1884, Journ. f. Orn., 32 p. 52: Mt. Meru, Tanganyika Territory.

Turacus hartlaubi crissalis Mearns, 1915, Smiths. Misc. Coll., 65, No. 13, p. 3: Mt. Mbololo, Taita, Kenya Colony.

♂ (M. C. Z. 168628) Sipi, U. December 1933.

♀ (M. C. Z. 168629) Butandiga, U. 10 January 1934.

♀ ♀ (M. C. Z. 168630-1) Mt. Mbololo, K. C. 16 & 20 April 1934.

Affinities. We have reexamined the same series on which Friedmann commented (1930, p. 251) and have nothing further to add. Both topotypes of *crissalis* have black thighs as defined by Mearns but do not differ in this respect from birds in the long Usambara series.

TURACUS LEUCOLOPHUS (Hartlaub)

Corythaix leucolophus Hartlaub, 1857, Syst. Orn. W. Africa, p. 159: Belina Mts., between lat. 4° and 5° N. in the Bari-Nile region.

3 ♂, 1 ♀ (M. C. Z. 168632-5) Mt. Debasien, U. 15-30 November 1933.

Citation. The original reference to the Journ. f. Orn., 1855 with citation of Heuglin as author of this species, furnished by Sclater (1924, p. 193) is entirely erroneous. *Turacus leucolophus* Heuglin 1856 is a *nomen nudum*. The name was first correctly introduced by Hartlaub as given above.

In this connection we wish to express our indebtedness to Dr. H. Friedmann for looking up certain references which were unavailable to us here.

Habits. Granvik (1934, p. 27) has stated that this species was difficult to obtain on Mount Elgon on account of its shyness. It was found that Debasien birds exhibited the same wary alertness making it extremely difficult to approach within gunshot.

MUSOPHAGA ROSSAE ROSSAE Gould

Musophaga rossae Gould, 1851, Proc. Zool. Soc. London, p. 93: said to have come from the western coast of Africa, (*i.e.* Loanda, *fide* Grant, 1915, Ibis, p. 413).

♀ (M. C. Z. 168636) Mt. Debasien, U. 14 November 1933.

♂ ♀ ♀ (M. C. Z. 168637-9) Elgonyi, U. 24-29 January 1934.

Affinities. We are by no means convinced that this bird should not be regarded as a race of *violacca* as was done by Grote (1922, p. 398). In view of the fact, however, that a western race of *rossae*, named *savanicola* by Grote, may occur alongside *violacca* in Northern Cameroon, we treat them for the present as distinct.

Parasites. Lice (*Laemobothrium tinnunculi*) were preserved from the feathers.

CORYTHAEOLA CRISTATA YALENSIS (Mearns)

Musophaga cristata yalensis Mearns, 1915, Smiths. Misc. Coll., 65, No. 13, p. 5: Yala River, Kavirondo, Kenya Colony.

4 ♂, 4 ♀ (M. C. Z. 168640-7) Yala River, K. C. 26-28 February 1934.

Variation. These topotypes, when compared with our series of West African birds, do show the rather fine differences which have been pointed out by van Someren (1922, p. 48).

CORYTHAIXOIDES LEUCOGASTER (Rüppell)

Chizaehris leucogaster Rüppell, 1842, Mus. Senckenb., **3**, p. 127: Southern Ethiopia.

♂ (M. C. Z. 168648) Voi, K. C. 7 April 1934

Affinities. Roberts (1926, p. 218) has proposed that this species be made the type of a monotypic genus for which he proposes the name *Criniferoides*. While this genus is probably as well differentiated as some other recent generic separations in the family, such as *Ruwenzorornis* and *Proturacus*, we scarcely think that further division is desirable.

CUCULIDAE

LAMPROMORPHA KLAASI (Stephens)

Cuculus klaasi Stephens, 1815, in Shaw, Gen. Zool., **9**, p. 128: Platte River (ex Levaillant).

♂ juv. (M. C. Z. 168649) Mt. Debasien, U. 30 November 1933

CENTROPUS MONACHUS FISCHERI Reichenow

Centropus fischeri Reichenow, 1887, Journ. f. Orn., **35** p. 57: Niakatschi.

♂ ♂ (M. C. Z. 168650-1) Kaimosi, K. C. 14 & 20 February 1934.

Affinities. In referring these birds to *fischeri*, of which we have only a juvenile from the Mabira Forest, Uganda, we are in agreement with the findings of van Someren (1932, p. 274).

Habitat. Not uncommon in the undergrowth and bushes fringing the forest and millpond. One of these birds was found drowned, floating at night upon the millpond. Several times individuals were disturbed at one side of the pond and with clumsy flight made off to the sedges on the further shore.

CENTROPUS SUPERCILIOSUS SUPERCILIOSUS Hemprich & Ehrenberg

Centropus superciliosus Hemprich & Ehrenberg, 1828, Symb. Phys., folio R., pl. xi: Southern Arabia.

♂ (M. C. Z. 168652) Lamu, Lamu Island, K. C. 11 May 1934.

Affinities. Friedmann (1930, p. 280) has given a full discussion on the status of the various races of this bird. In the absence of typical material from Arabia, we follow Friedmann in not recognizing *C. s. furvus* Friedmann (*n. n.* for *C. s. intermedius* van Someren,

preoccupied. Type locality, Mombasa) though it would seem distinctly advisable that the question of its status be reexamined when an adequate series of Arabian skins is available. Van Someren (1932, p. 275) refuses to accept Friedmann's view and maintains that *furvus* should be regarded as distinct.

TYTONIDAE

TYTO CAPENSIS LIBRATUS Peters & Loveridge

Tyto capensis libratus Peters & Loveridge, 1935, Proc. Biol. Soc. Washington, 48, p. 77: Kaimosi, Kakamega district, Nyansa Province, Kenya Colony.

Holotype ♀ (M. C. Z. 168653) Kaimosi, K. C. 21 February 1934.

STRIGIDAE

STRIX WOODFORDII SUAHELICA (Reichenow)

Syrnium suahelicum Reichenow, 1898, in Werther, Die Mittl. Hochl. des nördl. Deutsch-Ost-Afr., p. 272: Tanganyika Territory.

♂ ♀ (M. C. Z. 168654-5) Mt. Debasien, U. 18 November 1933.

♂ (M. C. Z. 168656) Kaimosi, K. C. 7 March 1934.

Native name. Ekeruk (Karamojong).

Affinities. Van Someren (1922, p. 45) has recorded this species from Moroto, northeast of Mt. Debasien, and both he and Granvik (1934, p. 40) referred their Mt. Elgon birds to this race. Our material is undoubtedly of this form but it seems likely that *suahelica* Reichenow, 1898 may have to become a synonym of *nigricantia* Sharpe, 1897, described from Mpwapwa, Tanganyika Territory.

Diet. Both Debasien birds had their stomachs distended with the remains of small beetles.

Habitat. The Debasien birds were shot at about 9 A.M. in gallery forest fringing the banks of a dry river bed on the western slopes at an altitude of 7,000 feet.

BUBO AFRICANUS AFRICANUS (Temminck)

Strix africana Temminck, 1823, Pl. col., livr. 9, pl. 1: Cape of Good Hope.

♂ ♀ (M.C.Z. 168657-8) Kaimosi, K. C. 6 March 1934.

Diet. The stomachs were full of the elytra of small beetles, among them those of a cockchafer were recognizable; in addition one bird held the fur of a small rodent.

Enemies. These owls were shot about 8 A.M. from some mighty mimosas where they were being mobbed by a party of small birds.

BUBO LACTEUS (Temminck)

Strix lactea Temminck, 1824, Pl. col., livr. 1, pl. 4: Senegal.

♂ ♀ (M. C. Z. 168659-60) Wema, Ngatana, K. C. 13 June 1934.

Native name. *Hwichi* (Kipokomo).

Diet. The stomach of one held the red legs of an Allen's Reed Hen (*Porphyryla alleni*) and its plumage; that of its mate contained feathers of what was apparently the same species.

CAPRIMULGIDAE

*CAPRIMULGUS EUROPAEUS EUROPAEUS Linné

Caprimulgus europaeus Linné, 1758, Syst. Nat., ed. 10, 1, p. 193: Europe and America (restricted type locality, Sweden, *apud* Hartert).

♂ (M. C. Z. 168661) Kaimosi, K. C. 16 February 1934.

Measurements. Wing to end of second primary, as outer ones in moult, 185 mm.

*CAPRIMULGUS EUROPAEUS MERIDIONALIS Hartert

Caprimulgus europaeus meridionalis Hartert, 1896, Ibis, p. 370: Greece.

♀ (M. C. Z. 168662) Kibwezi, K. C. 29 March 1934

Measurements. Wing 174 mm.

*CAPRIMULGUS EUROPAEUS UNWINI Hume

Caprimulgus unwini Hume, 1871, Ibis, p. 406: Agrore valley, Hazara district, northwest India.

♂ (M. C. Z. 168663) Voi, K. C. 13 April 1934.

Variation. We have compared this bird with an adult and an immature *unwini* from Turkestan. We find that the African bird possesses the large white wing spot characteristic of this race with which it also agrees in its paler coloration, paler than in either of the two European migrant races.

Measurements. Wing 197 mm.

Parasites. Hippoboscid flies (*Pseudolynchia rufipes*) were collected from its plumage where they were very abundant.

Habitat. This bird was one of several disturbed in the bed of the Voi River where they were resting upon the sand. It flew about a hundred feet, then settled upon a small branch at a height of six feet from the ground.

CAPRIMULGUS NUBICUS TARUENSIS van Someren

Caprimulgus nubicus taruensis van Someren, 1919, Bull. Brit. Orn. Club, **40**, p. 25: Tsavo, Kenya Colony.

♀ Juvenile (M. C. Z. 168664) Kibwezi, K. C. 29 March 1934.

♀ and egg (M. C. Z. 168665) Tsavo, K. C. 2 April 1934.

Breeding. I was particularly on the lookout for this bird when at Tsavo as I wished to procure a topotype, for the species was unrepresented in the collection of the Museum of Comparative Zoölogy.

On March 31, I disturbed a bird at 8 A.M. that was sitting on a single fresh egg at the base of a small scraggy thorn bush in this desert-like region. Returning at the same hour two days later, I found the bird incubating the solitary egg, I shot the bird and collected the egg which measures 26 x 19 mm. It has a white ground color, almost obscured around the upper pole by dull purple overlying brown; the lower half is blotched with brown but scarcely any purple. The egg was lying in a circular patch of sand about 100 mm. in diameter; the surrounding area without the circle was littered with gravel, twigs, etc.

Habitat. The Kibwezi bird was one of a pair sitting on the road a mile east of the station about 8 P.M. I shone a torch in its eyes and then shot it. The Southern European Nightjar was obtained on the same stretch of road in the same way and at the same time.

CAPRIMULGUS FOSSII CLARUS Reichenow

Caprimulgus clarus Reichenow, 1892, Journ. f. Orn., **40**, p. 29: Bukoba, Lake Victoria, Tanganyika Territory.

♂ ♀ (M. C. Z. 168666-7) Lamu, Lamu Id., K. C. 8 & 9 May 1934.

Breeding. A bird of this species which I disturbed on May 9, attracted my attention by the antics with which it attempted to draw me away from the vicinity of its young. Flying up to within ten feet of me, it would alight, then flop along the ground with one,

sometimes with both, wings outspread as if injured. The two young were obviously only just out of the eggs, dainty little balls of fluff.

Parasites. The male bird had numerous hippoboscid flies (*Pseudolychnia rufipes*) among its feathers.

COLIIDAE

COLIUS STRIATUS MOMBASSICUS van Someren

Colius striatus mombassicus van Someren, 1919, Bull. Brit. Orn. Club, **40**, p. 26: Changamwe, Kenya Colony.

♀ (M. C. Z. 168668) Lamu Island, K. C. 11 May 1934.

♀ (M. C. Z. 168669) Malindi, K. C. 29 June 1934.

Variation. In his description of this race van Someren states that his series was comprised of birds from along the coast between Mombasa and Lamu. We find these two females agree closely with our Mombasa birds being grayer than the more sandy brown *affinis* described from Dar es Salaam further south.

COLIUS STRIATUS JEBELENSIS Mearns

Colius striatus jebelensis Mearns, 1915, Proc. U. S. Nat. Mus., **48**, p. 394: Gondokoro, Uganda.

♂ ♂ (M. C. Z. 168670-1) Mt. Debasien, U. 20 & 25 November 1934.

♀ juv. (M. C. Z. 168672) Kaimosi, K. C. 1 March 1934.

Variation. With this small series we prefer to follow Friedmann (1930, p. 323) in referring the Debasien coly to *jebelensis* of which he regards *ugandensis* van Someren (1919, p. 26: Chagwe, Uganda) as a synonym. The correct determination of the juvenile bird from Kaimosi is less certain, perhaps it should be identified with *kikuyuensis* van Someren.

TROGONIDAE

APALODERMA NARINA NARINA (Stephens)

Trogon narina Stephens, 1815, in Shaw, Gen. Zool., **9**, p. 14: Anteniquoi, (i.e. Knysna district, Cape Province, *apud* Selater).

♀ ♀ (M. C. Z. 168673-4) Mt. Debasien, U. 21 & 29 November 1933.

♀ (M. C. Z. 168675) Sipi, Mt. Elgon, U. December 1933.

Distribution. The Mount Debasien birds were shot at 5,000 and 7,000 feet in the big trees fringing the Amaler River and one of its

tributaries. One might have expected the Elgon bird to have been *A. n. brachyurum* Chapin, but the measurements of all three are those of the typical form, viz. wings 125, 126, 125 mm., tails 178, 171, and 177 mm. in order as listed.

ALCEDINIDAE

CERYLE RUDIS RUDIS (Linné)

Alcedo rudis Linné, 1758, Syst. Nat., ed. 10, 1, p. 116: Egypt.

♂ (M. C. Z. 168676) Wema, Tana River, K. C. 18 June 1934.

Native name. *Tiglili* (Kipokomo).

HALCYON SENEGALOIDES RANIVORA Meinertzhagen

Halcyon senegaloides ranivora Meinertzhagen, 1924, Bull. Brit. Orn. Club, 44, p. 44: Pangani River, Tanganyika Territory.

♀ (M. C. Z. 168677) Kitau, Manda Id.; K. C. 16 May 1934.

Affinities. In the absence of topotypical material of *senegaloides* Smith for comparison, we refer this bird to the northern race of which we have a ♂ and ♀ from Dar es Salaam and Mombasa respectively.

HALCYON CHELICUTI VARIEGATA (Vieillot)

Alcedo Variegata Vieillot, 1820, Tabl. Encyc. Méth., Orn., pt. 1, p. 397: Senegal.

Breeding. On May 8, 1934, a pair of these kingfishers had a nestful of young in the stump of a coconut palm just outside Lamu, Lamu Island. The stump was only four feet in height and situated about a hundred feet from the entrance of my tent. Though there was a hole in the top (through which the rain entered until I stopped it with a coconut), the birds always entered and left by a woodpecker-like hole in the side at a height of three and a half feet from the ground. The birds were remarkably tame with so much activity going on around their home, if, however, anyone was passing the stump when one of the parents was returning with food, the bird generally sheered off and, perching on the branch of a nearby mango tree, patiently waited till the coast was clear.

CORACIIDAE

*CORACIAS GARRULUS GARRULUS Linné

Coracias garrulus Linné, 1758, Syst. Nat., ed. 10, 1, p. 107: Europe; restricted type locality, southern Sweden.

♂ ♀ (M. C. Z. 168678-9) Kibwezi, K. C. 24 March 1934.

♀ (M. C. Z. 168680) Tsavo, K. C. 2 April 1934.

Diet. The ♂ European Roller from Kibwezi had a large spider in its stomach; the ♀ had her stomach filled to capacity by seven very large grasshoppers.

CORACIAS CAUDATUS LORTI Shelley

Coracias lorti Shelley, 1885, Ibis, p. 399: plateau south of Berbera, Somaliland.

♂ (M. C. Z. 168681) Wema, Tana River, K. C. 18 June 1934.

Native name. *Nchorwe* (Kipokomo).

MEROPIDAE

MELITTOPHAGUS PUSILLUS CYANOSTICTUS (Cabanis)

Merops cyanostictus Cabanis, 1869, in von der Decken, Reise, 3, p. 34: Mombasa, Kenya Colony.

♂ (M. C. Z. 168682) Mt. Debasien, U. 15 November 1934.

♂ (M. C. Z. 168683) Voi, K. C. 13 April 1934.

MELITTOPHAGUS LAFRESNAYII OREOBATES Sharpe

Melittophagus oreobates Sharpe, 1892, Ibis, p. 320: Savé, Mount Elgon, Uganda.

♀ (M. C. Z. 168684) Elgonyi, Mt. Elgon, K. C. 22 January 1934.

Type locality. The type locality according to Sharpe is at 6,000 feet and in the description of Jackson's itinerary he states that it is on the north side of Mount Elgon. This places it on the Uganda side of the mountain and I have been able to locate it on an early map, "compiled from sketches." I feel reasonably certain that Savé corresponds to Sabei, (pronounced Sabé) which agrees in position and altitude. Elgonyi is also about 6,000 feet but is on the southeast and Kenya portion of the mountain.

Breeding. On January 22, 1934, two clutches, composed of three eggs each, were found at Elgonyi. The clutches were situated at

about a foot and one and a half feet respectively from the entrance of the burrows made in a high bank of red earth, the burrows being at a height of six feet from the ground. The female was shot as she left the nest-hole. The eggs, measuring 23 x 19 mm., were the usual white, and perfectly fresh.

PHOENICULIDAE

PHOENICULUS PURPUREUS MARWITZI (Reichenow)

Irrisor erythrorhynchus marwitzi Reichenow, 1906, Orn. Monatsb., **16**, p. 171: Mkalama, Kondoia Irangi district, Tanganyika Territory.

♂ (M. C. Z. 168685) Mt. Debasien, U. 25 November 1934.

Variation. The coloring of the body plumage is slightly intermediate between *marwitzi* and *niloticus* (Neumann) as might be expected. We refer it to *marwitzi* on account of the greenish underside of the wings.

PHOENICULUS BOLLEI JACKSONI (Sharpe)

Irrisor jacksoni Sharpe, 1890, Ann. Mag. Nat. Hist., (6), **6**, p. 503: Kikuyu country, Kenya Colony.

♂ ♀ imm. ♀ imm. (M. C. Z. 168686-8) Kaimosi, K. C. 26 February & 1 March 1934.

Distribution. The Kikuyu White-headed Kakelaar was also seen in the forest at Elgonyi, Mount Elgon.

BUCEROTIDAE

BYCANISTES BUCINATOR (Temminck)

Buceros bucinator Temminck, 1824, Pl. col. livr. 48, pl. clxxxiv: Cape of Good Hope, South Africa.

♂ ♂ (M. C. Z. 168689-90) Wema, Tana River, K. C. 15 & 16 June 1934.

BYCANISTES SUBCYLINDRICUS (Sclater)

Buceros subcylindricus P. Selater, 1870, Proc. Zool. Soc. London, p. 668, pl. xxxix; West Africa.

♂ (M. C. Z. 168691) Sipi, U. 22 December 1933.

♂ ♂ (M. C. Z. 168692-3) Elgonyi, K. C. 25 & 29 January 1934.

Native name. *Lingasa* (Lugishu).

Breeding. Granvik (1923, p. 98) gives an interesting account of the breeding of the Black-and-white Casqued Hornbill on Mount Elgon.

Enemies. The Bagishu relish this bird as an article of diet, requests for the carcasses of those skinned being numerous.

LOPHOCEROS ERYTHORHYNCHUS ERYTHORHYNCHUS (Temminck)

Buceros erythrorhynchus Temminck, 1823, Pl. col. livr., 36, sp. 19: Senegal.

♂ ♂ (M. C. Z. 168694-5) Karita River, U. 9 November 1933.

♂ (M. C. Z. 168696) Tsavo River, K. C. 5 April 1934.

LOPHOCEROS FLAVIROSTRIS FLAVIROSTRIS (Rüppell)

Buceros flavirostris Rüppell, 1835, Neue Wirbelth., Vög., p. 6, pl. ii: Taranta Mountains, Ethiopia.

♂ ♀ (M. C. Z. 168698-9) Tsavo River, K. C. 5 April 1934.

LOPHOCEROS JACKSONI Grant

Lophoceros jacksoni Ogilvie Grant, 1891, Ibis, p. 127: Turkwel, Suk, Kenya Colony.

♀ (M. C. Z. 168697) Tsavo River, K. C. 5 April 1934.

Distribution. It will be observed that the above record is southeasterly for this species, but another example in the collection, whose identification has been confirmed, was obtained by Loveridge (1923, p. 910) in central Tanganyika. Van Someren collected the very similar *deckeni* at Tsavo and it will be noted that Loveridge shot two other species there on the same day.

LOPHOCEROS MELANOLEUCOS GELOENSIS Neumann

Plate 1, fig. 1

Lophoceros melanoleucus geloensis Neumann, 1905, Journ. f. Orn., **53**, p. 187: Schekho on the Upper Gelo River, southwest Ethiopia.

♂ (M. C. Z. 168700) Sipi, U. 22 December 1933.

♂ ♂ ♀ (M. C. Z. 168701-3) Kaimosi, K. C. 25 February 1934.

Native name. *Gizombe* (Lugishu).

Variation. We feel fairly confident that the brown plumage cited as a subspecific character differentiating *suahelicus* and *stegmanni* is not

of taxonomic importance being probably due to the bleaching effects resulting from dwelling in open country, while birds inhabiting the wetter rain-forest regions are darker. Professor Neumann (*in litt.*) now considers *stegmanni* synonymous with *geloensis*.

Coloration. The three birds from Kaimosi were killed with a single shot, the gular skin of the males was black, that of the female greenish.

Breeding. As the junior author was passing down a forest trail at Sipi on December 21, 1933, a Gelo River Crowned Hornbill put its head out of a knot hole high up on a tree trunk. It quickly withdrew it again but as he continued watching the bird emerged and flew away. Though the bark of the tree was perfectly smooth, the trunk was only a foot in diameter so was climbed by the native gunbearer. He found nothing but rotted wood at the bottom of the hole so it seems probable that the bird was only prospecting for a nesting site.

INDICATORIDAE

INDICATOR INDICATOR (Sparrman)

Cuculus indicator Sparrman, 1777, Phil. Trans., **67**, p. 43, pl. i: Great Fish River, near Somerset East, Cape Province.

♂ ♂ (M. C. Z. 168704-6) Mt. Debasien, U. 14, 18, 21 November 1933.

♂ (M. C. Z. 168707) Tsavo, K. C. 5 April 1934.

Remarks. The Black-throated Honey Guide has been recorded from Mount Elgon and Tsavo by van Someren (1922, p. 53). Loveridge thought it was more abundant on Mount Debasien than in any other part of East Africa in which he had collected. The species is beloved by the Karamojong who are passionately fond of honey.

CAPITONIDAE

TRICHOLAEMA LACRYMOSUM LACRYMOSUM Cabanis

Tricholaema lacrymosa Cabanis, 1878, Journ. f. Orn., **26**, p. 205: Adi River, i.e. Athi River, Kenya Colony (*vide* p. 240).

♂ ♂ ♀ (M. C. Z. 168708-10) Voi, K. C. 7 April 1934.

♀ ♀ (M. C. Z. 168711-2) Mt. Mbololo, K. C. 25 & 28 April 1934.

Dict. These birds were gorging on wild figs which were just ripening at the time.

TRICHOLAEMA MELANOCEPHALUM STIGMATOTHORAX Cabanis

Tricholaema stigmatothorax Cabanis, 1878, Journ. f. Orn., **26**, p. 205: Ndi, Taita, Kenya Colony (*vide* p. 240).

♂ (M. C. Z. 168713) Tsavo, K. C. 4 April 1934.

Distribution. This Brown-throated Barbet is almost topotypic as Tsavo station is probably less than fifteen miles from Ndi.

GYMNOBUCCO BONAPARTEI CINEREICEPS Sharpe

Gymnobucco cinereiceps Sharpe, 1891, Ibis, p. 122: Mount Elgon.

7 ♂, 2 ♀ (M. C. Z. 168714–22) Elgonyi, K. C. 22 January to 4 February 1934.

TRACHYPHONUS DARNAUDII DARNAUDII (Prévost et Des Murs)

Micropogon darnaudii Prévost et Des Murs, 1850, in Lefebvre, Abyss., p. 133: Kordofan, Anglo-Egyptian Sudan.

♀ (M. C. Z. 168723) Karita River, U. 9 November 1933.

TRACHYPHONUS DARNAUDII BÖHMI Fischer & Reichenow

Trachyphonus Böhmii Fischer & Reichenow, 1884, Journ. f. Orn., **32** p. 179: Barawa, Juba River, Italian Somaliland (see Zedlitz, 1915, Journ. f. Orn., p. 16).

♀ (M. C. Z. 168724) Voi. K. C. 7 April 1934.

PICIDAE

CAMPETHERA NUBICA PALLIDA (Sharpe)

Dendromus pallidus Sharpe, 1902, Ibis, p. 638: Lamu, Kenya Colony.

♂ ♀ (M. C. Z. 168725–6) Kitau, Manda Id., K. C. 17–18 May 1934.

Distribution. Manda Island in Lamu district is only separated from Lamu Island by a narrow channel. The Pale Nubian Woodpecker was twice seen on Lamu Island by Loveridge who shot the Kitau birds when they were in an acacia tree growing on the beach.

DENDROPICOS FUSCESCENS MASSAICUS Neumann

Dendropicus guineensis massaicus Neumann, 1900, Journ. f. Orn., **48**, p. 206: Ndala-lani, Lake Nguruman.

♂ (M. C. Z. 168727) Kibwezi, K. C. 29 March 1934.

DENDROPICOS FUSCESCENS HEMPRICHII (Ehrenberg)

Picus hemprichii Ehrenberg, 1828, in Hemprich & Ehrenberg, Symb. Phys. Av., fol. r. : Akiko, Ethiopia.

♂ (M. C. Z. 168728) Lamu, Lamu Id., K. C. 11 May 1934.

♀ (M. C. Z. 168729) Kitau, Manda Id., K. C. 16 May 1934.

DENDROPICOS LAFRESNAYI LEPIDUS (Cabanis & Heine)

Ipctonus lepidus Cabanis & Heine, 1863, Mus. Hein., Th. 4, Heft 2, p. 118: Ethiopia.

♂ (M. C. Z. 168730) Kaimosi, K. C. 25 February 1934.

YUNGIPICUS OBSOLETUS INGENS Hartert

Iyngipicus obsoletus ingens Hartert, 1900, Novit. Zool., 7, p. 33: Nairobi, Kenya Colony.

♂ (M. C. Z. 168731) Mt. Debasien, U. 30 November 1933.

EURYLAEMIDAE

SMITHORNIS CAPENSIS MEINERTZHAGANI van Someren

Smithornis capensis meinertzhageni van Someren, 1919, Bull. Brit. Orn. Club, 40, p. 24: Lerundo, Kavirondo, Kenya Colony.

♂ ♂ (M. C. Z. 168732-3) Kaimosi, K. C. 23 February & 4 March 1934.

ALAUDIDAE

MIRAFRA POECILOSTERNA MASSAICA (Fischer & Reichenow)

Megalophonus massaicus Fischer & Reichenow, 1884, Journ. f. Orn., 32, p. 55: Klein-Arusha, Tanganyika Territory.

♂ ♀ ♀ (M. C. Z. 168734-6) Tsavo, K. C. 3, 4, 5 April 1934.

HIRUNDINIDAE

*HIRUNDO RUSTICA RUSTICA Linné

Hirundo rustica Linné, 1758, Syst. Nat., ed. 10, 1, p. 191: Europe; restricted type locality, Sweden (Hartert).

♂ ♂ (M. C. Z. 168737-8) Kibwezi, K. C. 24 March 1934.

♂ (M. C. Z. 168739) Tsavo, K. C. 3 April 1934.

HIRUNDO ANGOLENSIS ARCTICINCTA Sharpe

Hirundo arcticincta Sharpe, 1891, Ibis, p. 119: Mount Elgon at 7,000 feet, Kenya Colony.

3 ♂ 3 ♀ (M. C. Z. 168740-5) Elgonyi, Mt. Elgon, K. C. 23-29 January 1934.

Variation. This topotypical series of six swallows shot, like the types, at the Elgon caves, has been compared by us with five examples of the typical form of which three are topotypes and the remaining two from Kisenyi, Belgian Ruanda. These undoubtedly show that the northeastern bird, including one from Kome, Mwanza, averages paler on the abdomen. This is the view now held by Granvik (1934, p. 113) as opposed to his first action (1922, p. 118) in synonymizing *arcticincta* with the typical form.

Breeding. Only two pairs of Uganda Swallows were found in Kemp's Cave but three or four pairs in caves on the opposite escarpment. A couple were observed continually returning to a nest, attached to the roof at a height of twenty feet from the cave floor. By means of a tree brought to the spot, a native was able to ascend to the nest but found that it was only in process of being built. (January 23, 1934).

HIRUNDO RUFULA EMINI Reichenow

Hirundo emini Reichenow, 1892, Journ. f. Orn., **40**, p. 30: Bussisi, southern shore of Lake Victoria, Tanganyika Territory.

♂ ♀ (M. C. Z. 168746-7) Voi, K. C. 7 April 1934.

♂ ♀ (M. C. Z. 168748-9) Mt. Mbololo, K. C. 14 April 1934.

PTYONOPROGNE RUFIGULA RUFIGULA (Fischer & Reichenow)

Cotyle rufigula Fischer & Reichenow, 1884, Journ. f. Orn., **32**, p. 53: Lake Naivasha, Kenya Colony.

Breeding. Four nests of the Red-throated Rock Martin holding young which were being fed by their parents, were found attached to the roof of Kemp's and another cave below Elgonyi on the southern side of Mount Elgon, Kenya Colony, January 23-24, 1934.

CAMPEPHAGIDAE

CAMPEPHAGA QUISCALINA MARTINI Jackson

Campophaga martini Jackson, 1912, Bull. Brit. Orn. Club, **31**, p. 18: Ravine, i.e. Nandi, Kenya Colony.

1 (M. C. Z. 168750) Label detached. 1933-1934.

This Uganda Purple-throated Cuckoo Shrike was probably taken at Kaimosi, Kenya Colony, but its label is lost. The species has been recorded by van Someren (1922, p. 107) from Kakamega (in which district Kaimosi lies) and south Elgon.

CORACINA CAESIA PURA (Sharpe)

Graucalus purus Sharpe, 1891, Ibis, p. 121: Mount Elgon.

♂ (M. C. Z. 168751) Butandiga, U. 10 January 1934.

♂ (M. C. Z. 168752) Kirui's, K. C. 20 January 1934.

Distribution. It is not certain whether Jackson shot the type on the Uganda or Kenya side of the mountain so that both of these birds may be considered topotypes for both were shot on Mount Elgon.

DICRURIDAE

DICRURUS ADSIMILIS DIVARICATUS (Lichtenstein)

Muscicapa divaricata Lichtenstein, 1823, Verz. Doubl. Zool. Mus. Berlin, p. 52: Senegal.

♂ (M. C. Z. 168753) Karita River, U. 9 November 1933.

Affinities. The wing of this bird measures 124 mm. If the sexing is correct it comes very near the coast form, for van Someren (1922, p. 125) gives 130–136 mm. for Uganda males though Granvik (1934, p. 116) says 117–124 mm. for his birds from the Elgon region.

DICRURUS ADSIMILIS FUGAX Peters

Dicrurus fugax Peters, 1868, Journ. f. Orn., 16, p. 132: Tete and Inhambane, Mozambique.

♂ (M. C. Z. 168754) Lamu, Lamu Id., K. C. 11 May 1934.

Affinities. The wing of this bird measures 115 mm. but it is immature; van Someren (1922, p. 125) gives 117–127 mm. for coastal males.

ORIOLIDAE

*ORIOULUS ORIOULUS ORIOULUS (Linné)

Coracias Oriolus Linné, 1758, Syst. Nat., ed. 10, 1, p. 107: Europe, Asia. = Sweden *apud* Hartert.

♀ (M. C. Z. 168755) Voi, K. C. 7 April 1934.

♀ (M. C. Z. 168756) Mt. Mbololo, K. C. 24 April 1934.

Dict. These European Golden Orioles were feeding upon the freshly-ripened wild figs when shot.

ORIOLUS MONACHA ROLLETI Salvadori

Oriolus Rolleti Salvadori, 1864, Atti Soc. Italiana Sci. Nat. Milano, **7**, Riunione a Biella, p. 161: White Nile between lat. 4° and 5° N.

♂ ♂ (M. C. Z. 168757-8) Mt. Debasien, U. 13 & 29 December 1933.

♀ (M. C. Z. 168759) Sipi, Mt. Elgon, U. 22 December 1933.

In the third volume of the Catalogue of Birds of the British Museum, 1877, the original citation for this form was given as "Atti R. Accad. Torin. **7**, p. 151;". All subsequent authors have copied this, inserting 1864 as the year of publication; Reichenow in *Vögel Afrikas* gave a correct page number, but otherwise did his part in perpetuating the erroneous citation. We have checked Salvadori's description with specimens identified as *O. rolleti* and made the same comparison with *O. larvatus* Licht. and *O. brachyrhynchus* Swains. as did Salvadori. We should not have been surprised to find that the original description referred to something entirely different than the common conception of *rolleti*, since no one seems to have looked at Salvadori's article for at least sixty-eight years; nevertheless the name seems to be correctly allocated.

CORVIDAE

CORVULUR ALBICOLLIS (Latham)

Corvus albicollis Latham, 1790, Ind. Orn., **2**, p. 151: Africa.

♂ ♀ (M. C. Z. 168760-61) Mt. Debasien, U. 16 November 1933.

PARIDAE

PARUS ALBIVENTRIS ALBIVENTRIS Shelley

Parus albiventris Shelley, 1881, Ibis, p. 116: Ugogo, Tanganyika Territory.

♂ (M. C. Z. 168762) Mt. Debasien, U. 27 November 1933.

Distribution. Dr. van Someren (1922, p. 205) has recorded this species from Mount Moroto and Mount Elgon to the north and south of Debasien.

Measurements. Length of wing, 80 mm., which is rather small for males of the typical race for which van Someren gives 83-86 mm.

On the other hand, Granvik (1923, p. 227) gives 72-87 for four Elgon and upland males (is it possible that 72 is a misprint for 82?), later he (1934, p. 125) obtained four more males from Mount Elgon whose measurements were 77-85 mm. This would make the grounds for accepting Friedmann's small coastal race *curtus* rather slender; Selater (1930, p. 642, footnote) regarded it as doubtfully distinct. *P. a. curtus* was based on a young female from Taveta and he gives the range for the males as 75-77 mm. That of the females appears to be 72-75 mm.

ANTHOSCOPIUS MUSCULUS (Hartlaub)

Aegithalus musculus Hartlaub, 1882, Orn. Centralbl., p. 91: Lado (see Journ. f. Orn., **30**, 1882, p. 326).

♂ (M. C. Z. 168763) s. bank Greeki River, U. 7 December 1933.

Distribution. This locality is in the Sabei district at the north of Mount Elgon, about six miles in a direct line from the nearest mountain foothills.

TIMELIIDAE

ARGYRA RUBIGINOSA HEUGLINI Sharpe

Argyra heuglini Sharpe, 1883, Cat. Birds Brit. Mus., **7**, p. 391: Zanzibar.

♂ ♀ + 1 (M. C. Z. 168764-6) Kitau, Manda Id., K. C. 19 May 1934.

Synonymy. For the confusion in names applicable to this race see van Someren (1922, p. 235) but *saturata* Sharpe must be relegated to the synonymy of *heuglini* Sharpe as has already been done by Selater (1930, p. 356, footnote).

PYCNONOTIDAE

PYCNONOTUS TRICOLOR DODSONI Sharpe

Pycnonotus dodsoni Sharpe, 1895, Proc. Zool. Soc. London, p. 488: Sillul, Ogaden country, Ethiopia.

♂ ♀ (M. C. Z. 168767-8) Voi, K. C. 7 April 1934.

♂ ♂ ♂ (M. C. Z. 168769-71) Mt. Mbololo, K. C. 25-28 April 1934.

♂ (M. C. Z. 168772) Kitau, Manda Id., K. C. 16 May 1934.

Measurements. Those of the wings fall within the range given for this race by van Someren (1932, p. 347) in his revision of the forms found in East Africa.

PYCNONOTUS TRICOLOR FAYI Mearns

Pycnonotus layardi fayi Mearns, 1911, Smiths. Misc. Coll., 56, No. 20, p. 7: Fay's Farm, Njabini, Kenya Colony.

♂ ♀ ♀ (M. C. Z. 168773-5) Butandiga, U. 6 & 10 January 1934.

Variation. While two of these birds have the darker head of *fayi*, the third might well be referred to *minor* Heuglin, which latter race they should be according to van Someren (1932, p. 347). Thus they bear out Selater's (1930, p. 372) remarks that Mount Elgon is the meeting place of the two forms. Butandiga is situated on the western slopes at 7,000 feet.

PHYLLASTREPHUS SUCOSUS SUCOSUS Reichenow

Phyllastrephus cabanisi sucosus Reichenow, 1903, Journ. f. Orn., 54, p. 544: Bukoba, Tanganyika Territory.

♀ (M. C. Z. 168776) Kaimosi, K. C. 16 February 1934.

Distribution. Selater (1930, p. 383) in giving the range says "perhaps Elgon." There is an Elgon example from the Jackson collection in the Museum of Comparative Zoölogy which is inseparable from our Kaimosi bird. Elsewhere van Someren (1932, p. 344) has shown that its range extends eastward to Molo in Kenya Colony.

PHYLLASTREPHUS FISCHERI PLACIDUS (Shelley)

Xenocichla placida Shelley, 1889, Proc. Zool. Soc. London, p. 363: Kilimanjaro, Tanganyika Territory.

5 ♂ 1 ♀ (M. C. Z. 168777-82) Mt. Mbololo, K. C. 16-20 April 1934.

Synonymy. Van Someren (1932, p. 343) agrees that *keniensis* Mearns from Mount Kenya is a synonym of this race.

ARIZELOCICHLA MILANJENSIS STRIIFACIES (Reichenow & Neumann)

Xenocichla striifacies Reichenow & Neumann, 1895, Orn. Monatsb., 3, p. 74: Marangu, Kilimanjaro, Tanganyika Territory.

♂ ♂ ♀ (M. C. Z. 168783-5) Mt. Mbololo, K. C. 18-19 April 1934.

Distribution. Van Someren (1932, p. 345) has taken this race in the Taveta forest on the Lumi River.

Measurements. Wings. ♂ 90-92 mm., ♀ 86 mm. These are wholly comparable to birds from the Usambara and Uluguru Mountains, Tanganyika Territory.

STELGIDOCICHLA LATIROSTRIS EUGENIA (Reichenow)

Andropadus eugenius Reichenow, 1892, Journ. f. Orn., **40**, p. 53: Bukoba, Tanganyika Territory.

♂ (M. C. Z. 168786) Sipi, U. 22 December 1933.

♀ ♀ (M. C. Z. 168787-8) Elgonyi, K. C. 22 & 25 January 1934.

♀ (M. C. Z. 168789) Kaimosi, K. C. 16 February 1934.

Breeding. Testes of the Sipi bird were much enlarged.

EURILLAS VIRENS HOLOCHLORUS van Someren.

Eurillas virens holochlorus van Someren, 1922, Novit. Zool., **29**, p. 189: Sezibwa, Uganda.

♀ imm. (M. C. Z. 168790) Kaimosi, K. C. 1 March 1934.

Affinities. *Apropos* the remarks by Sclater and Moreau (1932, p. 683) on the Usambara birds referred to *E. v. zombensis* (Shelley) by Friedmann, we have laid out extensive series of *E. v. virens* (Cassin) from the Cameroons and observe them to be noticeably darker than the Usambara skins. Elgon birds, on the other hand, appear to occupy an intermediate position, conforming in their characteristics to those given by van Someren when describing *holochlorus*. Thus, so far as we are able to judge by our material, it does uphold van Someren's (1932, p. 346) later views.

Probably the Usambara birds should have been called *E. v. marwitzi* Reichenow, described from Kilimanjaro, but neither Friedmann nor we have any Nyasaland material by which to ascertain whether *marwitzi* is separable from *zombensis*.

TURDIDAE

TURDUS OLIVACEUS HELLERI (Mearns)

Planesticus helleri Mearns, 1913, Smithsonian Misc. Coll., **61**, No. 10, p. 1: Mount Mbololo, 4,000 feet, Kenya Colony.

♂ imm., ♂ ♀ ad. (M. C. Z. 168791-3) Mt. Mbololo, K. C. 14-20 April 1934.

Affinities. In a footnote, Sclater (1930, p. 441) suggests that *helleri* is closely related to, if not identical with, *T. o. roehli* Reichenow of the Usambara Mountains. Through the courtesy of Dr. H. Friedmann, we have been able to compare the type of *helleri* with these topotypes and also with topotypes of *roehli*. As a result we have no hesitation in saying that *helleri* is readily distinguishable by the sharply-defined

black crown, the more extensive white area on the posterior underparts, and the consequent reduction of the chestnut area. Both our adult birds agree with Mearns' type except that the upper parts are more olivaceous, the type having become somewhat foxed in the interval since it was collected.

TURDUS TEPHRONOTUS Cabanis

Turdus tephronotus Cabanis, 1878, Journ. f. Orn., 26, pp. 205, 218, pl. iii, fig. 2; Ndi, Taita district, Kenya Colony.

♂ (M. C. Z. 168794) Lamu Id. K. C. 11 May 1934.

♂ ♀ (M. C. Z. 168795-96) Kitau, Manda Id., K. C. 15 May 1934.
also two young in alcohol with same history.

Measurements. The wings are ♂ 106, 100. ♀ 100 mm. Two males from the Tana River, Kenya Colony measure 103, 102 mm., ♀ 102 mm. A pair from Dodoma and vicinity, central Tanganyika Territory are: ♂ 112. ♀ 104 mm. Males from Sagon River and Wobok, Ethiopia, Endoto and s. of Milele in Kenya measure 109, 108, 107 and 105, a female from this last locality was 100 mm.

Enemies. As I (Loveridge) was walking through the dense acacia scrub an hour before sunset, my attention was attracted by the cries of two Bare-eyed Thrushes fluttering in a nearby acacia. Scarcely pausing to think, though the idea flashed through my mind that they might be indulging in courting antics, I dropped both birds with a right and left shot.

My gunbearer ran to get them, stooping to pass beneath the low, spreading branches of the tree. Having picked up a bird he stood up on the far side, then called to me to come quickly as there was a snake in the tree. I ran under the acacia, then standing up, asked where the snake was. "Directly over your head," he replied. Looking up I saw not two feet above me a five-and-a-half-foot mamba (*Dendraspis angusticeps*). Moving to a distance so as not to injure the reptile, I shot it dead with a charge of dust shot. The gunbearer then said that he had noticed the bird flapping its wings in the snake's face just before I fired.

On reaching camp I examined the stomach contents of the mamba and found that it had first swallowed a bat (*Lavia frons rex*), then two well-grown, though still nestling, thrushes. Returning to the spot I located the thrushes' nest in the next tree to that in which I had shot the snake. Undoubtedly the parent birds were engaged in an attempt to drive it away.

**MONTICOLA SAXATILIS* (Linné)

Turdus saxatilis Linné, 1766, Syst. Nat., ed. 12, 1, p. 294: Mountains of Switzerland, Austria, and Prussia; Switzerland, (*apud* Hartert).

♂ (M. C. Z. 168797) Voi, K. C. 7 April 1934.

**OENANTHE OENANTHE OENANTHE* (Linné)

Motacilla oenanthe Linné, 1758, Syst. Nat., ed. 10, 1, p. 186: Europe; Sweden (*apud* Hartert).

♂ ♀ (M. C. Z. 168798-9) Mt. Debasien. U. 20 & 29 November 1933

**OENANTHE LEUCOMELA LEUCOMELA* (Pallas)

Motacilla leucomela Pallas, 1771, Novi Comm. Sci. Petrop., 14, p. 584, pl. xxii: Lower Volga.

♂ (M. C. Z. 168800) Mt. Debasien, U. 20 November 1933.

Synonymy. Selater (1930, p. 452, footnote) states that *pleschanka* Lepechin, though antedating *leucomela*, is not strictly a binomial name.

**OENANTHE ISABELLINA* (Temminck)

Saxicola isabellina Temminck, 1829, Pl. Col. livr. 79, pl. 472, fig. 1: Nubia.

1 + ♀ (M. C. Z. 168801-2) Tsavo, K. C. 31 March & 3 April 1934.

Migration. Previously recorded from Tsavo by van Someren (1922, p. 242) who (1931, p. 11) states that they move northwards in March.

PINAROCHROA SORDIDA RUDOLPHI Madarász

Pinarochroa rudolphi Madarász, 1912, Orn. Monatsb., 20, p. 175: Mount Elgon.

♀ (M. C. Z. 168803) Kaburomi, U. 29 December 1933.

♀ ♀ ♀ (M. C. Z. 168804-6) Madangi, U. 3 January 1934.

Synonymy. Selater (1930, p. 411, footnote) refers this form to the synonymy of *ernesti* from Mount Kenya. We have compared these topotypic birds, all shot in the alpine zone of Mount Elgon above 10,500 feet, with topotypes of *ernesti* from Mount Kenya in the collection of the Museum of Comparative Zoölogy. We find that the Elgon birds have darker ear-coverts while their superloreal stripes are more brown and less gray, in three of the Elgon series the breast plumage is richer brown, less gray. We therefore consider that Granvik (1923, p. 251) was justified in maintaining it as distinct. This author gives a good description of the behaviour and habitat of these interesting hill-chats.

CÔSSYPHA HEUGLINI HEUGLINI Hartlaub

Cossypha heuglini Hartlaub, 1886, Journ. f. Orn., **34**, p. 36: "Keren" *errore pro* Wau, Bahr el Ghazal, Sudan (*vide* Heuglin, Orn. Nordost-Afr., **1**, p. 375).

♂ (M. C. Z. 168807) Mt. Debasien, U. 18 November 1933.

CICHLADUSA GUTTATA RUFIPENNIS Sharpe

Cichladusa rufipennis Sharpe, 1901, Bull. Brit. Orn. Club, **12**, p. 35: Lamu, Kenya Colony.

♂ ♂ ♂ (M. C. Z. 168808-10) Kitau, Manda Id., K. C. 15-18 May 1934.

Distribution. These birds are practically topotypes, Kitau being separated from Lamu Island by a relatively narrow channel on the one hand and from the mainland (formerly called Lamu, more recently Lamu district) by a still narrower one.

Breeding. Several of the characteristic mud nests were found in acacias May 19, 1934. One held young, from another the young appeared to have flown, two others were inaccessible.

POGONOCICHLA MARGARITIFERA HELLERI Mearns

Pogonocichla cucullata helleri Mearns, 1913, Smiths. Misc. Coll., **41**, No. 20, p. 1: Mount Mbololo, Kenya Colony.

♂ ♂ (M. C. Z. 168811-2) Mt. Mbololo, K. C. 20-21 April 1934.

Synonymy. Sclater (1930, p. 487, footnote) synonymizes this form with *P. m. guttifer* (Reichenow & Neumann) from Kifinika, Kilimanjaro. As both topotypes are juveniles in spotted plumage we are unable to offer an opinion. The Mbololo birds were shot in the forest at 4,800 feet while the type of *guttifer* was taken at over 9,000 feet.

SYLVIIDAE

*SYLVIA BORIN (Boddaert)

Motacilla borin Boddaert, 1783, Table Pl. Enl., p. 35: France (*ex* Daubenton, Pl. Enl., 579, fig. 2).

♂ (M. C. Z. 168813) Elgoni, K. C. 22 January 1934.

♀ ♀ (M. C. Z. 168814-5) Kaimosi, K. C. 1 & 5 March 1934.

Migration. The Garden Warbler is a common migrant to East Africa, *vide* van Someren (1931, p. 16) who states that most of them

depart by the second week in April though he has obtained stragglers as late as the first week in May.

*SYLVIA ATRICAPILLA ATRICAPILLA (Linné)

Motacilla atricapilla Linné, 1758, Syst. Nat., ed. 10, 1, p. 187: Europe; restricted type locality, Sweden.

1 (M. C. Z. 168816) Kirui's, K. C. 20 January 1934.

♂ & 4 ♀ (M. C. Z. 168817-21) Elgonyi, K. C. 23-30 January 1934.

Migration. Both van Someren (1931, p. 15) and Selater and Moreau (1933, p. 19) have commented recently on the occurrence of the European Blackcap in Kenya and Tanganyika respectively.

*PHYLLOSCOPUS TROCHILUS TROCHILUS (Linné)

Motacilla trochilus Linné, 1758, Syst. Nat., ed. 10, 1, p. 188: England (*vide* Hartert, 1907, Vog. pal. Fauna, 1, p. 507).

♂ (M. C. Z. 168822) Mt. Debasien, U. 20 November 1933.

♂ (M. C. Z. 168823) Elgonyi, K. C. 30 January 1934.

♀ ♀ ♀ (M. Z. 168824-6) Kaimosi, K. C. 2 & 5 March 1934.

Migration. According to van Someren (1931, p. 14) the Willow Wren arrives in Kenya in September and departs in April though stragglers may occasionally be taken as late as July.

SEICERCUS RUFICAPILLA MINULLA (Reichenow)

Chloropeta minulla Reichenow, 1905, Orn. Monatsb., 13, p. 181: Mlalo, near Wilhelmstal (now Lushoto), Usambara Mountains, Tanganyika Territory.

♀ (M. C. Z. 168827) Mt. Mbololo, K. C. 16 April 1934.

Distribution. Selater (1930, p. 506) is mistaken in stating that this race is known only from the type locality, for Friedmann (1928, p. 93) recorded ten specimens of Loveridge's collecting from Bagilo, Nyingwa and Vituri in the Uluguru Mountains to the south as well as from Amani in the eastern Usambaras (Mlalo is in the western). More recently Moreau (1933, p. 20) has taken it at Amani and also in the Nguru Mountain. This Mbololo bird apparently constitutes the first record of its occurrence in Kenya Colony.

SEICERCUS UMBROVIRENS MACKENZIANUS (Sharpe)

Cryptolopha mackenziana Sharpe, 1892, Ibis, p. 153: Kikuyu, Kenya Colony.

♂ (M. C. Z. 168828) Sipi, Mt. Elgon, U. December 1933.

CALAMONASTES SIMPLEX SIMPLEX (Cabanis)

Thamnobia simplex Cabanis, 1878, Journ. f. Orn., **26**, pp. 205, 221: Ndi, Taita district, Kenya Colony.

♂ (M. C. Z. 168829) Tsavo, K. C. 4 April 1934.

Distribution. The type locality is only about fifteen miles from Tsavo from which place van Someren (1922, p. 228) has already taken the Sooty Scrub Warbler.

APALIS FLAVOCINCTA (Sharpe)

Euprinoides flavocinctus Sharpe, 1882, Journ. f. Orn., **30**, p. 346: Adi, *i.e.* Athi River, Kenya Colony.

♂ (M. C. Z. 168830) Kitau, Manda Id., K. C. 18 May 1934.

Affinities. Though Sclater (1930, p. 524) treats this bird as a race of *flavida*, van Someren (1932, p. 367) has adduced good reasons for regarding it as a full species.

APALIS PORPHYROLAEMA PORPHYROLAEMA Reichenow & Neumann

Apalis porphyrolaema Reichenow & Neumann, 1895, Orn. Monatsb., **4**, p. 75: Eldama, Kenya Colony.

♂ (M. C. Z. 168831) Sipi, Mt. Elgon, U. 23 December 1933.

Breeding. The testes of this bird were very large.

APALIS RUFIFRONS RUFIDORSALIS (Sharpe)

Dryodromas rufidorsalis Sharpe, 1897, Bull. Brit. Orn. Club, **6**, p. 48: Tsavo River, Kenya Colony.

♂ (M. C. Z. 168832) Tsavo River, K. C. 2 April 1934.

SYLVIETTA BRACHYURA LEUCOPSIS (Reichenow)

Sylviella leucopsis Reichenow, 1879, Orn. Centralbl., p. 114: Kibaradja, Tana River, Kenya Colony.

♂ (M. C. Z. 168833) Tsavo River, K. C. 5 April 1934.

SYLVIETTA LEUCOPHRYS LEUCOPHRYS (Sharpe)

Sylviella leucophrys Sharpe, 1891, Ibis, p. 120: Mount Elgon.

♂ (M. C. Z. 168834) Sipi, Mt. Elgon, U. 22 December 1933.

EREMOMELA PUSILLA ELGONENSIS van Someren

Eremomela elegans elgonensis van Someren, 1920, Bull. Brit. Orn. Club, **40**, p. 92: Kibingei, south Elgon, Kenya Colony.

3 ♂ 1 ♀ (M. C. Z. 168469-72) Mt. Debasien, U. 25 & 29 November 1933.

Distribution. These records form a slight extension of the range northwards in Uganda.

EREMOMELA BADICEPS TURNERI van Someren

Eremomela badiceps turneri van Someren, 1920, Bull. Brit. Orn. Club, **40**, p. 92: Yala River, Kakamega, Kenya Colony.

♀ (M. C. Z. 168835) Kaimosi, K. C. 5 March 1934.

Distribution. This bird is actually a topotype as Turner's camp site was only a hundred yards from where Loveridge camped in 1934 and the latter did much of his collecting in the forest along the banks of the Yala River.

Measurements. Wing 48 mm.

CAMAROPTERA BREVICAUDATA ASCHANI Granvik

Camaroptera brevicaudata aschani Granvik, 1934, Rev. Zoöl. Bot. Afr., **25**, p. 101: northeastern slopes of Mount Elgon, Kenya Colony.

♀ (M. C. Z. 168836) Mt. Debasien, U. 29 November 1933.

Affinities. Granvik (1934, p. 103) has recorded a bird from Kache-liba, at the southeastern foot of Debasien, as an intermediate between *aschani* and *abyssinica* of Zedlitz. Our bird, collected at 5,000 feet on the western slopes of the mountain, may be in the same position. It is in post nuptial moult and does not appear to be immature but lack of adequate comparative material renders it inadvisable for us to attempt to discuss the status of the races.

Measurements. Wing 51.5 mm.

CAMAROPTERA BREVICAUDATA GRISEIGULA Sharpe

Camaroptera griseigula Sharpe, 1892, Ibis, p. 158: Voi River, Taita, Kenya Colony.

♂ ♂ (M. C. Z. 168837-8) Kibwezi, K. C. 27 March 1934.

Measurements. Wings 54, 55 mm. See Granvik (1934, p. 101) for discussion of type.

CISTICOLA CHUBBI Sharpe

Cisticola chubbi Sharpe, 1892, Ibis, p. 157: Kimangitchi, Mt. Elgon.

♂ (M. C. Z. 168839) Kaburomi, U. 28 December 1933.

♂ (M. C. Z. 168840) Kaimosi, K. C. 23 February 1934.

Affinities. Kaburomi is on western Elgon at about 10,500 feet. After comparing these birds with *nigriloris* Shelley from northwest Lake Nyasa, one wonders why Lynes did not reduce the latter to subspecific relationship with *chubbi*. Doubtless he had good reasons for treating them as distinct.

CISTICOLA GALACTOTES HAEMATOCEPHALA Cabanis

Cisticola haematocephala Cabanis, 1868, Journ. f. Orn., 16, p. 412: Mombasa, Kenya Colony.

4 ♂ (M. C. Z. 168841-4) Kitau, Manda Id., K. C. 17-18 May 1934.

♂ ♀ nest & eggs (M. C. Z. 168845-7) Wema, K. C. 11-14 June 1934.

Native name. Dowe (Kipokomo).

Measurements. A male from Mombasa has a wing of 58 mm., the four males from Manda Island measure 50-56 mm.

Breeding. At Wema, Tana River, on the night of June 14, 1934 a hen bird was netted on her nest in long grass after several attempts to shoot her during the preceding day. Unfortunately she broke one egg and punctured a second with her claws. The nest, which was attached to long grasses at a height of eighteen inches from the ground, measured 120 mm. high by 70 mm. in diameter, being slightly domed. Both within and without it was composed of dry grasses kept together to a slight extent by vegetable down. It held three fresh eggs, measuring 17 x 13 mm., of a pale pink ground color blotched with dark red, these red blotches were chiefly concentrated in a circle round the larger pole.

CISTICOLA TROGLODYTES TROGLODYTES (Antinori)

Drymoica troglodytes Antinori, 1864, Cat. Deser. Coll. Uccelli, p. 38: Djur, Bahr el Ghazal, Sudan.

4 ♂ 1 ♀ (M. C. Z. 168848-52) Mt. Debasien, U. 16-30 November 1933.

Variation. These birds in November plumage bear out the remarks of Granvik (1934, p. 109) on their dress. Van Someren (1932, p. 362) doubts the correctness of referring Suk and Turkana birds, with which he would presumably include these Karamojo skins, to the typical form.

MELOCICHLA MENTALIS ORIENTALIS (Sharpe)

Cisticola orientalis Sharpe, 1883, Cat. Birds Brit. Mus., 7, p. 245: Pangani River, Tanganyika Territory.

♂ (M. C. Z. 168853) Kibwezi, K. C. 28 March 1934.

PRINIA MISTACEA IMMUTABILIS van Someren

Prinia mistacea immutabilis van Someren, 1920, Bull. Brit. Orn. Club, 40, p. 93: Lake Nakuru, Kenya Colony.

♂ ♂ ♂ (M. C. Z. 168854-6) Mt. Debasien, U. 29 November 1932.

Distribution. Granvik (1934, p. 110) has recorded this race from Mount Elgon.

PRINIA MISTACEA TENELLA (Cabanis)

Drymoica tenella Cabanis, 1869, in von der Decken, Reise, 3, p. 23: Mombasa, Kenya Colony.

Breeding. At Witu on June 1, 1934 a Mombasa Tawny-flanked Longtail completed her clutch and commenced sitting. The nest, which was attached to tall *mpimbi* grass stems at a height of three and a half feet from the ground, measured 115 mm. high by 70 mm. in diameter, being composed of dry grass lined with finer grasses. It held three fresh eggs, measuring 17 x 11 mm., of a pale sea-green ground color blotched with pale brown, chiefly around the larger pole, and scribbled and splashed with sepia brown to a lesser extent. Van Someren (1922, p. 219) has obtained this race at Witu as well as on the islands of Lamu and Manda.

PRINIA SOMALICA ERLANGERI Reichenow

Prinia somalica erlangeri Reichenow, 1905, Orn. Monatsb., 13, p. 24: Gurra country, S. Somaliland.

♂ ♀ (M. C. Z. 168857-8) Kitau, Manda Id., K. C. 18 May 1934.

Synonymy. *P. intermedia* Jackson from the Northern Guaso Nyiro is regarded as a synonym.

PRINIA LEUCOPOGON REICHENOWI (Hartlaub)

Burnesia reichenowi Hartlaub, 1890, Journ. f. Orn., 38, p. 151: Njangalo, northeastern Belgian Congo.

♂ ♀ (M. C. Z. 168859-60) Kaimosi, K. C. 12 & 16 February 1934.

PRINIA BAIRDII MELANOPS (Reichenow & Neumann)

Burnesia melanops Reichenow & Neumann, 1895, Orn. Monatsb., 3, p. 75:
Mau, Kenya Colony.

♀ (M. C. Z. 168861) Kaimosi, K. C. 1 March 1934.

MUSCICAPIDAE

ALSEONAX MINIMUS INTERPOSITUS van Someren

Alseonax minimus interpositus van Someren, 1930, Journ. E. Africa & Uganda
Nat. Hist. Soc., No. 37, p. 194: Molo, Kenya Colony.

♂ ♂ ♀ (M. C. Z. 168862-4) Mt. Debasien, U. 20-25 November 1933.

♂ (M. C. Z. 168865) Butandiga, K. C. 6 January 1934.

♂ ♀ (M. C. Z. 168866-7) Elgonyi, K. C. 22-25 January 1934.

♂ (M. C. Z. 168868) Kaimosi, K. C. 1 March 1934.

Variation. In the absence of topotypic material of *A. m. murinus* from Mount Meru for comparison, we follow Granvik (1934, p. 70) in referring our Elgon birds to this race though it appears to be based on rather slender grounds.

ALSEONAX MINIMUS MURINUS Fischer & Reichenow

Alseonax murina Fischer & Reichenow, 1884, Journ. f. Orn., 32, p. 54: foot of
Mount Meru, Tanganyika Territory.

♂ (M. C. Z. 168869) Mt. Mbololo, K. C. 19 April 1934.

This bird is a juvenile and in consequence its identification somewhat questionable, being based in part on geographical considerations.

BRADORNIS PALLIDUS SUBALARIS Sharpe

Bradornis subalaris Sharpe, 1873, Proc. Zool. Soc. London, p. 713, pl. lviii,
fig. 1: Mombasa, Kenya Colony.

♀ (M. C. Z. 168870) Kibwezi, K. C. 24 March 1934.

♂ ♀ (M. C. Z. 168871-2) Lamu Id., K. C. 11 May 1934.

♂ (M. C. Z. 168873) Kitau, Manda Id., K. C. 16 May 1934.

Breeding. The Kibwezi bird is a young one in speckled plumage but appears to belong to the coastal race without question and not to *suaahelicus*.

BRADORNIS PALLIDUS SUAHELICUS van Someren

Bradornis pallidus suahelicus van Someren, 1921, Bull. Brit. Orn. Club, **41**, p. 104: Londiani, Kenya Colony.

1 + 4 ♂ 1 ♀ (M. C. Z. 168874-9) Mt. Debasien, U. 14-29 November 1933.

Distribution. Granvik (1934, p. 71) obtained a good series of the Uganda Pale Flycatcher on Mount Elgon.

DIOPTROORNIS FISCHERI Reichenow

Dioptrornis Fischeri Reichenow, 1884, Journ. f. Orn., **32**, p. 53: Mount Meru, Tanganyika Territory.

♂ 3 ♀ (M. C. Z. 168880-3) Kaimosi, K. C. 16 February & 2 March 1934.

BATIS MOLITOR PUELLA Reichenow

Batis puella Reichenow, 1893, Jahrb. Hamburgischen Wiss. Anstalten, **10**, part 1, p. 125: No locality. (Type from Bussisi, s. shore of Lake Victoria, Tanganyika Territory, in Berlin Museum).

♂ ♀ (M. C. Z. 168884-5) Mt. Debasien, U. 29 November 1933.

♂ (M. C. Z. 168886) Butandiga, U. 15 January 1934.

Variation. The throat of the ♀ is pure white, in this respect being similar to a female from Mount Elgon referred to by Granvik (1934, p. 74) as lacking the chin spot. We identify these birds with *puella* rather than with *B. o. perkeo* Neumann on account of the larger size of their wings, viz. ♂♂ 62, 60 mm.; ♀ 60 mm.

BATIS MINOR SUAHELICUS Neumann

Batis minor suahelicus Neumann, 1907, Journ. f. Orn., **55**, p. 353: Kahe, near Kilimanjaro, Tanganyika Territory (*fide* type in Berlin Museum).

♂ (M. C. Z. 168887) Kitau, Manda Id., K. C. 16 May 1934.

Distribution. This bird has previously been recorded as occurring on Manda and Lamu Islands by van Someren (1932, p. 296).

PLATYSTEIRA PELTATA JACKSONI Sharpe

Platystira jacksoni Sharpe, 1891, Ibis, p. 445: Sotik, Kenya Colony.

♂ ♀ ♀ (M. C. Z. 168888-90) Elgoni, K. C. 22-30 January 1934.

Distribution. Granvik (1934, p. 75) discusses the plumage variation in a series of these flycatchers which he obtained on the eastern slopes of Mount Elgon.

Corrigenda. The two birds (M. C. Z. 148620-1) from Igale, Poroto Mountains, referred to typical *peltata* by Bangs & Loveridge (1933, p. 190), are actually *jacksoni* conforming with that race in the steely blue reflections of their plumage.

ERRANORNIS LONGICAUDA TERESITA (Antinori)

Elminia teresita Antinori, 1864, Cat. Descr. Coll. Ucc., p. 50: Djur, Bahr el Ghazal, Sudan.

♂ (M. C. Z. 168891) Elgonyi, K. C. 31 January 1934.

Distribution. The Bahr el Ghazal Blue Flycatcher occurs in the dry scrub and Baobab bush below 7,000 feet where I found it as common as did Granvik (1934, p. 75) on the northeast slopes of the mountain.

TCHITREA VIRIDIS VIRIDIS (Müller)

Muscicapa viridis Müller, 1776, Natursyst., Suppl., p. 171: Senegal.

♂ ♂ (M. C. Z. 168892-3) Mt. Debasien, U. 16 & 20 November 1933.

Variation. One of these Paradise Flycatchers has the back and tail reddish brown, the tail only half grown, measuring 130 mm., the other with a tail of 330 mm., has both back and tail almost pure white.

MOTACILLIDAE

*MOTACILLA CINEREA CINEREA Tunstall

Motacilla cinerea Tunstall, 1771, Orn. Brit., p. 2: Great Britain.

♂ ♂ ♂ (M. C. Z. 168894-6) Mt. Debasien, U. 14 & 15 November 1933.

Migration. Granvik (1934, p. 61) obtained the Gray Wagtail on Mount Elgon in November and December 1926.

ANTHUS SORDIDUS LONGIROSTRIS Neumann

Anthus nicholsoni longirostris Neumann, 1905, Orn. Monatsb., **13**, p. 77: Gardulla, Lake Gandjula (*i.e.* Lake Abaya), Ethiopia.

♂ (M. C. Z. 168897) Mt. Mbololo, K. C. 26 April 1934.

ANTHUS RICHARDI LACUUM Meinertzhagen

Anthus richardi lacuum Meinertzhagen, 1920, Bull. Brit. Orn. Club, **41**, p. 22: Lake Naivasha, Kenya Colony.

♀ (M. C. Z. 168898) Malindi, K. C. 29 June 1934.

Measurements. This is a particularly small bird with wing of 74.5 mm., its head is damaged and its plumage worn so that the identification is none too certain.

**ANTHUS TRIVIALIS TRIVIALIS* (Linné)

Alauda trivialis Linné 1758, Syst. Nat., ed. 10, 1, p. 166: Sweden.

♂ (M. C. Z. 168899) Mt. Debasien, U. 28 November 1933.

Migration. Granvik (1934, p. 62) collected the Tree Pipit on Mount Elgon also in November and December 1926.

MACRONYX CROCEUS CROCEUS (Vieillot)

Alauda crocea Vieillot, 1816, Nouv. Dict. d'Hist. Nat., 1, p. 365: "Java" (Senegal, *vide* Swainson.)

1 (M. C. Z. 168900) Mt. Debasien, U. 16 November 1933.

♂ (M. C. Z. 168901) Elgonyi, K. C. 28 January 1934.

Breeding. Granvik (1934, p. 63) found the Yellow-throated Long-claw nesting on Mount Elgon on June 23 (1923, p. 200).

LANIIDAE

LANIUS EXCUBITORIUS PRINCEPS Cabanis

Lanius princeps Cabanis, 1850, Mus. Hein., Heft 1, p. 73, note: Sources of the Nile, Sudan.

♂ (M. C. Z. 168902) N. bank Greeki River, U. 6 November 1933.

Distribution. The actual spot where these birds were very abundant and our specimen shot, is known as Nabugut, though no village marks the site.

Synonymy. Selater (1930, p. 611, footnote) synonymized this race with the typical form; but van Someren (1922, p. 123; 1932, p. 311) upholds it as a bird of migratory habits and smaller wing measurements. Our specimen has a wing of 111 mm. We have a pair of birds from south Ankole (wings 114, 114 mm.) taken by Loveridge's native collector at the same time as van Someren's collector secured the birds referred by him to "*excubitorius* Rehw." (1922, p. 123). As Reichenow is not the author of *excubitorius* it seems obvious that that the subspecific name *böhmi* was accidentally omitted. Presumably these are the same birds which later (1932, p. 311) he referred to *L. e. princeps*.

LANIUS MACKINNONI Sharpe

Lanius mackinnoni Sharpe, 1891, Ibis, p. 444, pl. xiii: Kavirondo, Kenya Colony. (Type from Bugemaia *vide* Ibis, 1891, p. 596).

2 ♂ 3 ♀ (M. C. Z. 168903-7) Kaimosi, K. C. 16 February 1934.

*LANIUS COLLURIO Linné

Lanius collurio Linné, 1758, Syst. Nat., ed. 10, 1, p. 94: Europe (*i.e.* Sweden, *vide* Hartert).

♀ (M. C. Z. 168908) Tsavo, K. C. 2 April 1934.

♂ ♂ (M. C. Z. 168909-10) Voi, K. C. 10 & 13 April 1934.

Migration. Van Someren (1931, p. 21) refers to large flocks in the Tsavo-Taru area which departed northward on April 20.

CORVINELLA CORVINA CHAPINI Friedmann & Bowen

Corvinella corvina chapini Friedmann & Bowen, 1933, Proc. Biol. Soc. Washington, 46, p. 121: Kibigori, Kavirondo, Kenya Colony.

1 (M. C. Z. 168911) Kitale, K. C. 25 December 1928.

This Yellow-billed Strike was given to me for presentation to the museum by Mr. Jeffries of Kitale. He has noted on the label "Bill yellow, legs greyish. Wing 125 mm."

LANIARIUS FERRUGINEUS MAJOR (Hartlaub)

Telephonus major Hartlaub, 1848, Rev. Zool., p. 108: Elmina, Gold Coast.

♂ ♀ (M. C. Z. 168912-3) Kaimosi, K. C. 23 February 1934.

Measurements. Wing of ♂, 99 mm., ♀ 93 mm. See also Granvik (1934, p. 120) who obtained this race on Mount Elgon.

LANIARIUS LÜHDERI CASTANEICEPS Sharpe

Laniarius castaneiceps Sharpe, 1891, Ibis, p. 445: Mount Elgon.

♂ (M. C. Z. 168914) Elgoni, K. C. 4 February 1934.

Synonymy. This race, which Selater (1930, p. 621, footnote) following Jackson, disallowed, is upheld by van Someren (1932, p. 306) and substantiated by our measurements which are 80 and 85 mm. for the wings of these two males from Mount Elgon, while the wings of two males from the Cameroons measure 89 and 91 mm.

DRYOSCOPIUS AFFINIS (Gray)

Hapalophus affinis G. R. Gray, 1837, Mag. Nat. Hist., **1**, (n.s.) p. 489: Zanzibar.

♀ (M. C. Z. 168915) Lamu Id., K. C. 9 May 1934.

♂ (M. C. Z. 168916) Mkonumbi, K. C. 29 May 1934.

Distribution. Van Someren (1922, p. 120) mentions birds from Lamu which were presumably part of the rich collections made for him in this region by Mr. H. J. Allen Turner.

TSCHAGRA AUSTRALIS EMINI (Reichenow)

Telephonus australis emini Reichenow, 1893, Orn. Monatsb., **1**, p. 60: Bukoba, Tanganyika Territory.

♂ (M. C. Z. 168917) Mt. Debasien, U. 21 November 1933.

Measurements. Wing 80.5 mm. Granvik's (1934, p. 121) experience of collecting opposite sexes of this and the succeeding species in the same locality, is corroborated by two of our examples of the genus.

TSCHAGRA SENEGALA ARMENA (Oberholser)

Pomatorhynchus senegalus armenus Oberholser, 1906, Proc. U. S. Nat. Mus., **30**, p. 809: Taveta, Kenya Colony.

♀ (M. C. Z. 168918) Mt. Debasien, U. 13 November 1933.

Measurements. Wing 85 mm.

TSCHAGRA SENEGALA ORIENTALIS (Cabanis)

Pomatorhynchus orientalis Cabanis, 1869, in von der Decken, Reise **3**, p. 27: Mombasa, Kenya Colony.

Breeding. At Peccatoni near Witu, on May 28, 1934, a nest of the Mombasa Black-headed Tchagra was found in a low dom palm at a height of four feet from the ground and in a very exposed position. It held a single egg, a second egg was laid about 9 A.M. on the 29th. On the 30th I visited the nest several times before 7.15 A.M. but the bird had not managed to complete her clutch so I left her in peace as camp had been struck and I could not delay further.

TSCHAGRA JAMESI MANDANA (Neumann)

Telephonus jamesi mandanus Neumann, 1903, Orn. Monatsb., **11**, p. 183: Manda Island, Kenya Colony.

♂ (M. C. Z. 168919) Lamu, Lamu Id., K. C. 11 May 1934.

Breeding. At Kitau, Manda Island, on May 17, 1934, a topotype of this race was seen on its nest. Several attempts to surprise her leaving the nest so as to get a shot, failed, for she slipped off into the surrounding thickets too quickly and would not return so long as I waited in the vicinity. The nest was built, or one might say 'slung' between two dry twigs, one of acacia, the other of a climbing euphorbia which was literally smothering the acacia in which the nest had been placed at a height of seven feet from the ground. The nest, measuring on the outside 50 mm. high by 100 mm. in diameter, was 30 mm. deep by 70 mm. in diameter on the inside. Externally it was composed of skeleton leaves and shreds of grass-like bark, internally it was roughly lined with a few coarse grasses, fibres and a single feather.

It held three fresh eggs, measuring 20 x 13 mm., of a white ground heavily flecked with brown except for the upper pole which is capped with brown almost to the exclusion of the ground color.

RHODOPHONEUS CRUENTUS CATHEMAGMENUS (Reichenow)

Laniarius cathemagmenus Reichenow, 1887, Journ. Orn., **35**, p. 63: Loeru.

♂ (M. C. Z. 168920) Tsavo, K. C. 4 April 1934.

Affinities. We follow van Someren (1932, p. 305) in regarding this Rosy-patched Shrike as a race of *cruentus* instead of a full species as is done by Selater (1930, p. 638). This action is justified by the comparative material in the museum collection.

PRIONOPIDAE

PRIONOPS CRISTATA OMOENSIS Neumann

Prionops cristatus omoensis Neumann, 1905, Journ. f. Ornith., **53**, p. 216: Omo River, Ethiopia.

1 + ♂ (M. C. Z. 168921-2) Karita River, U. 9 November 1933.

? ♂ (M. C. Z. 168923) Mt. Debasien, U. 29 November 1933.

Measurements. Wings of Nos. 168921-2, 126 and 124 mm., No. 168923, 114 mm.

STURNIDAE

CINNYRICINCLUS LEUCOGASTER VERREAUXI (Bocage)

Pholidauges verreauxi Bocage, 1870, in Finsch & Hartlaub, Vög. Ost-Afr., p. 867: Caconda, Angola.

3 ♂ 1 ♀ (M. C. Z. 168924-7) Mt. Debasien, U. 25 & 30 November 1933.

♀ (M. C. Z. 168928) Voi, K. C. 7 April 1934.

Synonymy. The status of the race *lauragrayae* Bowen has recently received attention from van Someren (1932, p. 313) and Sclater and Moreau (1933, p. 206), the former unable to support it, the latter rather doubting its validity.

After measuring an extensive series in the Museum of Comparative Zoölogy, we are quite unable to endorse Bowen's claim that smaller size is a characteristic of birds inhabiting the area which he assigns to *lauragrayae*. Conversely some of our East African birds are actually larger than South African specimens, the measurements not even overlapping. Furthermore we concur with Sclater that the amount of white in the tail feathers is too variable a character to receive consideration.

LAMPROCOLIUS CHALYBEUS SYCOBIUS Hartlaub

Lamprocolius sycobius Hartlaub, 1859, Journ. f. Orn., 7, p. 19: Tete, Mozambique.

♂ ♀ ♀ (M. C. Z. 168929-31) Voi, K. C. 7 April 1934.

Synonymy. Van Someren (1921, Bull. Brit. Orn. Club, 41, p. 124) proposed the name *pestis* for birds which are intermediate in size between typical *chalybeus* of the Sudan and Ethiopia, and *sycobius* of Mozambique. Sclater (1930, p. 657, footnote) relegates *pestis* to the synonymy of *sycobius* an action with which we are in agreement notwithstanding the defence offered by van Someren (1932, p. 315). The measurements of the three Voi birds listed above are of little significance for the ♂ (wing, 113 mm.) and a ♀ (wing, 118 mm.) are young while the other ♀ is moulting.

LAMPROCOLIUS SPLENDIDUS SPLENDIDUS (Vieillot)

Turdus Splendidus Vieillot, 1822, Tabl. Encyc. Méth. Orn., pt. 2, p. 653. Malimba, Portuguese Congo.

♂ (M. C. Z. 168932) Kaimosi, K. C. 25 February 1934.

LAMPROTORNIS PURPUROPTERUS PURPUROPTERUS Rüppell

Lamprotornis purpuropterus Rüppell, 1845, Syst. Uebers., pp. 64, 75, pl. xxv: Shoa, Ethiopia.

♂ ♀ (M. C. Z. 168933-4) Mkonumbi, K. C. 29 May 1934.

Distribution. Though well to the east of the distribution of this race as defined by Sclater (1930, p. 661) we have no hesitancy in

identifying these birds as *purpureopterus* after comparing them with skins from Ethiopia, the Ithanga Hills, Kenya Colony and Ukerewe Island, Lake Victoria, Tanganyika Territory.

ONYCHOGNATHUS MORIO SHELLEYI (Hartert)

Amydrus morio shelleyi Hartert, 1891, Kat. Vogelsamml. Mus. Senck., p. 75
note: Ugogo, Tanganyika Territory.

♂ (M. C. Z. 168935) Mt. Mbololo, K. C. 25 April 1934.

ONYCHOGNATHUS MORIO RUPPELLII (Verreaux)

Amydrus ruppellii Verreaux, 1856, in Chenu, Encycl. d'Hist. Nat. Ois., 5,
p. 166: Ethiopia.

♂ (M. C. Z. 168936) Butandiga, U. 4 January 1934.

♂ ♂ ♂ (M. C. Z. 168937-9) Elgoni, K. C. 29 & 31 January 1934.

Synonymy. In 1919 van Someren described *montanus* from Mount Elgon and Selater (1930, p. 665) gives its range as from 9,000 to 10,000 feet. Our birds are from the west and south slopes of Mount Elgon at about 7,000 feet. Granvik (1934, p. 129) refers two females which he collected on Elgon to *ruppellii* and states that he does not consider *montanus* to be distinct from *ruppellii*. It is very probable that this author does not appreciate the significance of altitude in this connection.

Our birds are clearly not *montanus* for they are smaller, not larger than *ruppellii*, nor are their bills different from Ethiopian examples of *ruppellii*. Three males of the latter from Maraco, Ethiopia, measure: Bills, 28, 27, 26 mm. Wings, 163, 161, 162 mm. Our four Elgon males measure: Bills, 28, 29, 29, 25.5 mm. Wings, 152, 152, 155, 149 mm.

SPREO SUPERBUS (Rüppell)

Lamprocolius superbus Rüppell, 1845, Syst. Uebers., pp. 65, 75, pl. xxvi:
Shoa, Ethiopia.

♂ (M. C. Z. 168940) Tsavo, K. C. 4 April 1934.

BUPHAGUS ERYTHRORYNCHUS CAFFER Grote

Buphagus erythrorynchus caffer Grote, 1927, Orn. Monatsb., 35, p. 13: Selala River, Transvaal.

♂ (M. C. Z. 168941) Kaimosi, K. S. 26 February 1934.

NECTARINIIDAE

Nectarinia formosa centralis "Neumann" van Someren, 1916, Ibis, p. 446:
"Scrub country", i.e. Lusasa, Uganda.

♂ (M. C. Z. 168942) Kaburomi, U. 30 December 1933.

Variation. This specimen appears to constitute the first record for any race of Malachite Sunbird on Mount Elgon. The bird has strong coppery reflections on the crown, cheeks and anterior underparts which at first led us to suppose that it must be *N. f. cupreconitens* Shelley, but close examination shows that this color is not symmetrically distributed and furthermore it is easily washed off with a little plain water. This stain therefore is probably from the nectar of the flowers from which the bird feeds. The question naturally arises, is not the copper red gloss on the plumage of the type of *cupreconitens* of similar origin?

In the absence of topotypical material of *cupreconitens* we have been able to make comparison only with *aenigularis* and *centralis* and conclude that while the latter is not too well characterized it may usually be distinguished by the slightly greener, less blue, gloss on the posterior underparts. On this basis our specimen is *centralis* though it agrees with *aenigularis* in having a more strongly decurved bill.

NECTARINIA KILIMENSIS KILIMENSIS Shelley

Nectarinia kilimensis Shelley, 1884, Proc. Zool. Soc. London, p. 555: Kilimanjaro, about 5,000 feet, Tanganyika Territory.

♀ (M. C. Z. 168943) Kaburomi, U. 30 December 1933.

♀ (M. C. Z. 168944) Kaimosi, K. C. 2 March 1934.

CINNYRIS BIFASCIATUS TSAVOENSIS van Someren

Cinnyris bifasciatus tsavoensis van Someren, 1922, Novit. Zool. **29**, p. 196: Tsavo, Kenya Colony.

♂ ♀ (M. C. Z. 168945-6) Voi, K. C. 10 & 11 April 1934.

Voi is less than thirty miles distant from Tsavo, the type locality.

CINNYRUS VENUSTUS IGNEIVENTRIS Reichenow

Cinnyris igneiventris Reichenow, 1899, Orn. Monatsb., **7**, p. 171: Karagwe, Uganda.

♀ (M. C. Z. 168947) Sipi, U. 14 December 1933.

♂ (M. C. Z. 168948) Kaburomi, U. 30 December 1933.

♂ (M. C. Z. 168949) Butandiga, U. 6 January 1934.

CINNYRIS VENUSTUS FALKENSTEINI Fischer & Reichenow

Cinnyris Falkensteini Fischer & Reichenow, 1884, Journ. f. Orn., **32**, p. 56:
Lake Naivasha, Kenya Colony.

♂ ♀ ♀ (M. C. Z. 168950-2) Kaimosi, K. C. 16 Feb. to 5 March 1934.

CINNYRIS REICHENOWI REICHENOWI Sharpe

Cinnyris reichenowi Sharpe, 1891, Ibis, p. 444: Sotik, Kenya Colony.

6 ♂ ♂ (M. C. Z. 168953-8) Kaimosi, K. C. 25 Feb. and 5 March 1934.

CHALCOMITRA AMETHYSTINA KALCKREUTHI Cabanis

Cinnyris (Chalcomitra) kalckreuthi Cabanis, 1878, Journ. f. Orn., **26**, pp. 205,
227: Mombasa, Kenya Colony.

♂ ♂ (M. C. Z. 168959-60) Lamu, Lamu Id., K. C. 11 May 1934.

CHALCOMITRA AMETHYSTINA DOGGETTI (Sharpe)

Cinnyris doggetti Sharpe, 1902, Ibis, p. 116: Ravine, Kenya Colony.

♂ ♀ (M. C. Z. 168961-2) Mt. Debasien, U. 29 November 1933.

♂ (M. C. Z. 168963) Elgonyi, K. C. 31 January 1934.

♂ (M. C. Z. 168964) Kibwezi, K. C. 29 March 1934.

♂ ♀ (M. C. Z. 168965-6) Voi, K. C. 10 & 12 April 1934.

CHALCOMITRA SENEGALENSIS AEQUATORIALIS (Reichenow)

Cinnyris aequatorialis Reichenow, 1899, Orn. Monatsb., **7**, p. 171: Bukoba,
Tanganyika Territory.

♂ (M. C. Z. 168967) Mt. Debasien, U. 20 November 1933.

CHALCOMITRA VERTICALIS VIRIDISPLENDENS (Reichenow)

Cinnyris viridisplendens Reichenow, 1892, Journ. f. Orn., **40**, pp. 54, 132:
Bukoba, Tanganyika Territory.

♂ (M. C. Z. 168969) Kirui, Kitosh, K. C. 20 January 1934.

♂ ♀ (M. C. Z. 168970-1) Kaimosi, K. C. 16 Feb. & 1 March 1934.

CYANOMITRA OLIVACEA RAGAZZII (Salvadori)

Eleocerthia ragazzii Salvadori, 1888, Ann. Mus. Civ. Genova, **26**, p. 247:
Ferkérié-ghem Forests, Shoa, Ethiopia.

♂ (M. C. Z. 168968) Kaimosi, K. C. 5 March 1934.

ANTHREPTES COLLARIS UGANDAE van Someren

Anthreptes collaris ugandae van Someren, 1921, Bull. Brit. Orn. Club, **41**, p. 113:
Maraquet (i. e. Marakwet), Kenya Colony.

♂ (M. C. Z. 168972) Elgonyi, K. C. 31 January 1934.

5 ♂ ♂ (M. C. Z. 168973-7) Kaimosi, K. C. 1 & 5 March 1934.

ZOSTEROPIDAE

ZOSTEROPS VIRENS JACKSONI Neumann

Zosterops jacksoni Neumann, 1899, Orn. Monatsb., **7**, p. 23: Mau, Kenya Colony.

Zosterops yalensis van Someren, 1922, Novit. Zool., **29**, p. 191: Kaimosi, Kenya Colony.

Zosterops elgonensis van Someren, 1922, Novit. Zool., **29**, p. 191: Bukedi, Mount Elgon, Uganda.

1 + ♂ 2 ♀ ♀ (M. C. Z. 168978-81) Kaburomi, Elgon, U. 28 December 1933.

2 ♀ ♀ (M. C. Z. 168982-3) Elgonyi, Elgon, K. C. 23 January 1934.

♂ 4 ♀ ♀ (M. C. Z. 168984-8) Kaimosi, K. C. 1 & 5 March 1934.

Synonymy. Sclater (1930, p. 675, footnote) refers *yalensis* and *elgonensis* to the synonymy of *jacksoni*. In 1932 van Someren (1932, p. 349) defends their validity, even claiming full specific rank for *yalensis*. Later Granvik (1934, p. 134) when studying his series of white-eyes from Mount Elgon fails to recognize *elgonensis* which he thinks is a straight synonym of *jacksoni*.

It will be observed that our Kaimosi series are topotypes of *yalensis* while our Elgon birds are from near the type locality of *elgonensis*. The measurements are as follows:—Kaburomi, 58-63 mm., Elgonyi, 56-59 mm., Kaimosi, 56-58 mm. We purposely omit giving them by sex as native sexing is liable to question, except when the native skimmers are of long service and known to be trustworthy. The Kaburomi birds are a trifle larger than those from lower levels yet van Someren's measurements for *jacksoni* are 62-65 mm., for *elgonensis* he gives 56-61, for *yalensis* 58-62 (thirty skins).

The Kaburomi birds which were shot in the tree heaths just above the forest limits at 10,500 feet are perhaps a trifle paler than those from lower levels. There is so much variation shown in the series from the various localities that we concur in Sclater's action considering that the *Zosterops* from this region have been subjected to far too critical dividing.

Breeding. At Kaimosi on March 5, 1934, the oviduct of a female bird was found to hold a fully-formed white egg though without shell, it measured 16 x 11 mm.

ZOSTEROPS VIRENS STUHLMANNI Reichenow

Zosterops stuhlmanni Reichenow, 1892, Journ. f. Orn., **40**, p. 54: Bukoba, Tanganyika Territory.

2 ♂ 2 ♀ (M. C. Z. 168989-92) Mt. Debasien, U. 11-30 November 1933.

Distribution. This is rather a surprising locality for this race but after careful comparison with a topotype and series of *stuhlmanni* we find them only a shade less yellowish green above than that form, distinctly more yellowish than our Elgon birds referred to *jacksoni*.

ZOSTEROPS SILVANUS Peters & Loveridge

Zosterops silvanus Peters & Loveridge, 1935, Proc. Biol. Soc. Washington, **48**, p. 77: Mt. Mbololo, 4,800 feet, Taita, Kenya Colony.

2 ♂ ♂ 2 ♀ ♀ (M. C. Z. 168993-6) Mt. Mbololo, K. C. 21 April 1934.

Distribution. Known only from the type series listed above, one of which is now in the British Museum (N. H.). The type is a ♂ (M. C. Z. 168994). Closely related to *Z. winifredae* Sclater & Moreau with the type of which one of these has been compared.

PLOCEIDAE

DINEMELLIA DINEMELLI DINEMELLI (Rüppell)

Textor dinemelli Rüppell, 1845, Syst. Uebers., p. 72, pl. xxx: Shoa, Ethiopia (ex Horsfield mss.).

♂ (M. C. Z. 168997) Tsavo, K. C. 5 April 1934.

♂ (M. C. Z. 168998) Marareni, nr. Malindi, K. C. 26 June 1934.

Measurements. Van Someren (1932, p. 317) states that birds from Taita, near Tsavo, are intermediate between the nominate form and

böhmi with wings from 115–124 mm. Our Tsavo bird is wholly typical with a wing of 109 mm., the Malindi bird is 116 mm.

PLOCEPASSER MAHALI MELANORHYNCHUS Bonaparte

Plocepasser melanorhynchus Bonaparte, 1851, Consp. Gen. Av., 1, p. 444: Shoa, Ethiopia (ex Rüppell, 1845, Syst. Uebers., p. 78).

♂ (M. C. Z. 168999) Karita River, U. 9 November 1933.

1 (M. C. Z. 169000) Tsavo, K. C. 4 April 1934.

PASSER GRISEUS GONGONENSIS (Oustalet)

Pseudostruthus gongonensis Oustalet, 1890, La Naturaliste, p. 274: Gongoni, near Mombasa, Kenya Colony.

♀ (M. C. Z. 168473) Lamu, Lamu Id., K. C. 11 May 1934.

GYMNORIS PYRGITA MASSAICA Neumann

Gymnoris pyrgita massaica Neumann, 1908, Bull. Brit. Orn. Club, 21, p. 70: Kikuyu, Kenya Colony.

♀ (M. C. Z. 168474) Voi, K. C. 7 April 1934.

PLOCEUS INSIGNIS INSIGNIS (Sharpe)

Sycobrotus insignis Sharpe, 1891, Ibis, p. 117, pl. vi, fig. 1: Mount Elgon.

♂ (M. C. Z. 168475) Elgonyi, K. C. 25 January 1934.

Corrigenda. In treating of this species, van Someren (1932, p. 319) states: "Selater admits three races, and a race of a race!" and proceeds to make deductions from what is most obviously a slip such as occur in van Someren's own paper where, for example, he breaks up *Poliospiza angolensis* into races and a race of a race (1932, p. 330).

PLOCEUS MELANOGASTER STEPHANOPHORUS (Sharpe)

Heterhyphantes stephanophorus Sharpe, 1891, Ibis, p. 117, pl. vi, fig. 2: Mau, Kenya Colony.

♂ (M. C. Z. 168476) Kaimosi, K. C. 1 March 1934.

PLOCEUS NIGRICOLLIS NIGRICOLLIS (Vieillot)

Malimbus nigricollis Vieillot, 1805, Ois. Chant., p. 74, pl. xlv, Malimba, Portuguese Congo.

♂ (M. C. Z. 168477) Kaimosi, K. C. 1 March, 1934.

Synonymy. We have carefully compared this skin with a large series from Cameroon, Gaboon, Angola and the eastern Belgian Congo and fail to find any justification for the reviving of the race *vacillans* van Someren (type locality: Budongo, Uganda) as has been attempted by van Someren (1932, p. 320).

PLOCEUS NIGRICOLLIS MELANOXANTHUS (Cabanis)

Hyphanturgus melanoxanthus Cabanis, 1878, Journ. f. Orn., **26**, pp. 205, 232:
Mombasa, Kenya Colony.

♀ (M. C. Z. 168479) Lamu, Lamu Id., K. C. 9 May 1934.

♀ (M. C. Z. 168478) Kitau, Manda Id., K. C. 18 May 1934.

PLOCEUS BOJERI BOJERI (Cabanis)

Hyphantornis bojeri Cabanis, 1869, in von der Deeken's, Reise, **3**, Vögel, p. 32:
Mombasa, Kenya Colony (ex. mss. Finsch & Hartlaub).

♂ (M. C. Z. 168480) Kkonumbi, K. C. 29 May 1934.

♂ (M. C. Z. 168481) Malindi, K. C. 29 June 1934.

Affinities. Slater (1930, p. 748) treats *bojeri* as a race of *aureo flavus* but van Someren (1932, p. 321) has shown that this cannot be. Slater (1930, p. 748, footnote) refers *alleni* Mearns from Meru River, Mount Kenya to the synonymy. Previously van Someren (1922, p. 140) thought it barely recognizable as being rather larger than the coast birds. A re-examination of the type and a good series convinces us that there is no differentiation in size but the form appears to be recognizable on the basis of deeper coloration, particularly on the top of the head and below. On the other hand, our topotypic material of *bojeri* is very scanty, doubtless both Slater and van Someren had more extensive series on which to base their conclusions.

Breeding. On June 7, 1934, a nest of the usual type but with the slightest of tunnel-entrances, was found overhanging the Tana River in the vicinity of Ngau. It held two eggs of a sea-green ground color mottled all over with gray or gray-brown.

On June 14, 1934, three nests were found in close proximity, each attached to a spray of thorn growing from knee-deep water in a flooded area close to the Tana River at Ngatana. Each nest held two eggs, two of these clutches were similar in type but the third had a ground color of white, or faintly bluish white, so thickly overlaid with fawn as to give the eggs the appearance of being almost uniform

fawn. All three clutches held embryos. Nearby another nest held naked young; a fifth was lying on the water, waterlogged except for its entrance in which crouched a large, though featherless, nestling. I restored it to a vertical position before leaving it.

EUPLECTES NIGROVENTRIS Cassin

Euplectes nigroventris Cassin, 1848, Proc. Acad. Nat. Sci. Phila., p. 66: Zanzibar.

Breeding. On June 2, 1934, a nest of the Zanzibar Red Bishop was found near Witu. The nest, which was attached to reeds growing in a pond, was some three feet above the level of the water. It measured about 150 mm. high by 50 mm. in diameter being of the usual domed type with side entrance and composed of fine grasses. It held three fresh eggs, measuring 18 x 13 mm., of a pale greenish blue ground color but while two were only very sparsely and minutely dotted with black, the third was well blotched all over with gray or black.

On June 19, 1934, at Wema, Ngatana, two nests were found containing young.

EUPLECTES CAPENSIS XANTHOMELAS Rüppell

Euplectes xanthomelas Rüppell, 1840, Neue Wirbelth., Vög., p. 94: Temben and Simen, Ethiopia.

♀ (M. C. Z. 168482) Kibwezi, K. C. 24 March 1934.

This bird was captured as it fluttered on the ground, its feathers being so gummed together by sticky seeds that it is doubtful whether it would ever have got them freed.

URAEGINTHUS BENGALUS BRUNNEIGULARIS Mearns

Uraeginthus bengalus brunneigularis Mearns, 1911, Smiths. Misc. Coll., 56, No. 20, p. 6: Wambugu, Mt. Kenya, Kenya Colony.

♀ (M. C. Z. 168490) Kibwezi, K. C. 24 March 1934.

URAEGINTHUS BENGALUS UGOGOENSIS Reichenow

Uraeginthus bengalus var. *ugogoensis* Reichenow, 1911, Mitt. Zool. Mus. Berlin, 5, p. 228: Ugogo, Tanganyika Territory.

Uraeginthus bengalus littoralis van Someren, 1922, Novit. Zool., 29, p. 160: Mombasa, Kenya Colony.

Uraeginthus bengalus loveni Granvik, 1923, Journ. f. Orn., **71**, p. 181: Mombasa, Kenya Colony.

♂ ♂ (M. C. Z. 168491-92) Kitau, Manda Id., K. C. 16-17 May 1934.

Synonymy. We have compared these birds with topotypes of both *ugogoensis* and *littoralis* and cannot see that van Someren (1932, p. 327) has any grounds for reversing Sclater's (1930, p. 804, footnote) decision as to the disposition of the latter in the synonymy of the former.

URAEGINTHUS BENGALUS UGANDAE Zedlitz

Uraeginthus bengalus ugandae Zedlitz, 1911, Journ. f. Orn., **59**, p. 606: Entebbe, Uganda.

♂ (M. C. Z. 168493) Kaimosi, K. C. 24 March 1934.

Previously recorded from this locality by van Someren (1922, p. 160).

GRANATINA IANTHINOGASTER IANTHINOGASTER (Reichenow)

Uraeginthus ianthinogaster Reichenow, 1879, Orn. Centralbl., p. 114: Massa, Tana River, Kenya Colony.

♀ (M. C. Z. 168494) Kibwezi, K. C. 26 March 1934.

COLIUSPASSER ARDENS SUAHELICA (van Someren)

Penthretia laticauda suahelica van Someren, 1921, Bull. Brit. Orn. Club, **41**, p. 121: Nairobi River, Kenya Colony.

♂ (M. C. Z. 168483) Mt. Debasien, U. 21 November 1933.

This Kenya Red-naped Whydah is in fresh off-season plumage, whether correctly sexed or not.

SPERMOPHAGA RUFICAPILLA RUFICAPILLA (Shelley)

Spermospiza ruficapilla Shelley, 1888, Proc. Zool. Soc. London, p. 30: Bellima, Uele district, Belgian Congo.

♂ (M. C. Z. 168484) Kaimosi, K. C. 26 February 1934.

PYTILIA MELBA KIRKI Shelley

Pytelia kirki Shelley, 1903, Bull. Brit. Orn. Club, **13**, p. 76: Lamu, Kenya Colony.

♂ ♀ (M. C. Z. 168485-6) Tsavo, K. C. 4 April 1934.

♀ (M. C. Z. 168487) Kitau, Manda Id., K. C. 17 May 1934.

Affinities. Van Someren (1932, p. 325) considers Tsavo birds are intermediate between *kirki* and *belli* and this is also the case with our skins from that locality. The male having red lores but less barring on the abdomen.

We use the name *kirki*, which Selater (1930, p. 788, footnote) refers to the synonymy of *soudanensis*, as our Kitau bird is practically topotypic of *kirki* while the type locality of *soudanensis* is uncertain, and the status of the forms still somewhat unsettled.

ESTRILDA ASTRILD NYANZAE Neumann

Estrilda astrild nyanzae Neumann, 1907, Journ. f. Orn., **55**, p. 596: Bukoba, Tanganyika Territory.

Juv. (M. C. Z. 168488) Butandiga, U. 13 January 1934.

ESTRILDA NONNULA NONNULA (Hartlaub)

Astrilda nonnula Hartlaub, 1883, Journ. f. Orn., **31**, p. 425: Kudurma, Bahr el Ghazal, Sudan.

♀ juv. (M. C. Z. 168489) Butandiga, U. 11 January 1934.

FRINGILLIDAE

POLIOSPIZA ANGOLENSIS REICHENOWI (Salvadori)

Serinus reichenowi Salvadori, 1888, Ann. Mus. Civ. Genova, **26**, p. 272: Cialalaka, Shoa, Ethiopia.

♀ (M. C. Z. 168495) Voi, K. C. 7 April 1934.

Measurements. Wing 62 mm., compared with examples from Alaba, Guaso Nyiro and Kapiti Plains which measure from 67 to 69 mm.

POLIOSPIZA STRIOLATA UGANDAE van Someren

Poliospiza striolata ugandae van Someren, 1921, Bull. Brit. Orn. Club, **41**, p. 114: Mount Elgon.

♀ (M. C. Z. 168496) Kaburomi, U. 30 December 1933.

♀ (M. C. Z. 168497) Madangi, U. 3 January 1934.

Both these birds being from Mount Elgon, they may be considered topotypical.

EMBERIZA FLAVIVENTRIS FLAVIVENTRIS Stephens

Plate 2, fig. 1.

Emberiza flaviventris Stephens, 1815, Gen. Zool., 9, part 2, p. 374: Cape of Good Hope.

Nest, eggs, ♀ (M. C. Z. 168498) Mt. Debasien, U. 25 November 1933.

♂ ♀ (M. C. Z. 168499-168500) Tsavo, K. C. 4 April 1934.

Breeding. On November 20, 1933, a nest of the Golden-breasted Bunting was found in the fork of a thorn-tree at a height of about five feet from the ground. The nest, measuring 60 mm. in depth by 100 mm. in outside diameter, was 30 mm. in depth by 55 mm. in diameter inside. Externally it was composed of shredded grasses, tendrils and rootlets, inside it was neatly lined with hair. When found it held a single egg, on revisiting the nest on November 25, I found only two eggs, these showed slight traces of incubation and measured 20 x 15 mm. Their ground color was faintly bluish white on which was a circumpolar ring of faint purple and black scribblings, elsewhere only a few scattered dots. The female was shot.

BIBLIOGRAPHY

BANGS, O. and LOVERIDGE, A.

1933. "Reports on the Scientific Results of an Expedition to the South-western Highlands of Tanganyika Territory. Part III. Birds." Bull. Mus. Comp. Zoöl., **75**, pp. 143-221, pl. i.

BANNERMAN, D. A.

1930. "The Birds of Tropical West Africa." **1**, pp. i-lxxv, 1-376, figs. 1-119, pls. i-x. London.

FRIEDMANN, HERBERT

1928. "A Collection of Birds from the Uluguru and Usambara Mountains, Tanganyika Territory." Ibis, pp. 74-99.
1930. "Birds collected by the Childs Frick Expedition to Ethiopia and Kenya Colony." Bull., U. S. Nat. Mus. no. 153, pp. i-xiii, 1-516, figs. 1-22, pls. i-xii.

GRANT, C. H. B. and MACKWORTH-PRAED, C. W.

1933. "On the Races and Distribution of the African and Arabian Kestrels of the *Falco tinnunculus* group with descriptions of two new races." Bull. Brit. Orn. Club, **54**, pp. 75-83.
1934. "On the races of the Lizard-Buzzard, *Kaupifalco monogrammicus* Temm." Bull. Brit. Orn. Club, **54**, pp. 130-131.
1934. "Eastern races of *Francolinus sephaena* (Smith)." Bull. Brit. Orn. Club, **54**, pp. 170-173.

GRANVIK, HUGO

1923. "Birds collected by the Swedish Mount Elgon Expedition 1920." Journ. f. Orn., **71**, Sonderheft, pp. 1-280, pls. i-xi.
1934. "The Ornithology of North Western Kenya Colony with special regard to the Suk and Turkana Distrikt." Rev. Zool. Bot. Afr., **25**, pp. 1-190, pls. i-iv.

GROTE, HERMANN

1922. "Bermerkungen über einige neue afrikanische Formen." Journ. f. Orn., **70**, pp. 397-404.
1931. "Die Gliederung des Formenkreises *Treron australis* (L.)." Anz. Orn. Ges. Bayern, **2**, pp. 140-141.

PETERS, JAMES L.

1931. "Check-List of Birds of the World." **1**, pp. i-xviii, 1-345. Cambridge, Mass.
1934. "Check-List of Birds of the World." **2**, pp. i-xvii, 1-401. Cambridge, Mass.

PETERS, JAMES L. and LOVERIDGE, A.

1935. "New Birds from Kenya Colony." Proc. Biol. Soc. Washington, **48**, pp. 77-78.

ROBERTS, AUSTIN

1926. "Some Changes in Nomenclature, New Records of Migrants and New Forms of S. African Birds." *Ann. Transv. Mus.*, **2**, pp. 217-225.

SCLATER, W. L.

1924. "Systema Avium Aethiopicarum." Part I, i-iv, 1-304. London.
1930. "Systema Avium Aethiopicarum." Part II, i-xi, 305-922. London.

SCLATER, W. L. and MOREAU, R. E.

1932. "Taxonomic and Field Notes on some Birds of North-eastern and Tanganyika Territory." Parts I-V. *Ibis*, 1932, pp. 487-522,
1933. pls. vi-vii; pp. 656-683. 1933, pp. 1-33; pp. 187-219, pl. vi; pp. 399-440.

SOMEREN, V. G. L. van

1916. "List of Birds collected in Uganda and British East Africa, with notes on their nesting and other habits. "Parts I-I. *Ibis*, pp. 193-252, pls. iv-vi; pp. 373-472, pls. viii-xiii.
1918. "Notes on a collection of Birds from Lamu and district, made by Mr. H. J. Allen Turner in April 1916." *Journ. E. A. & Uganda Nat. Hist. Soc.*, no. 6, pp. 251-261.
1918. "A further contribution to the Ornithology of Uganda (West Elgon and district)." *Novit. Zool.*, **25**, pp. 263-290.
1922. "Notes on the Birds of East Africa." *Novit. Zool.*, **29**, pp. 1-246, pls. i-vi.
1925. "The Birds of Kenya and Uganda." Part II. *Journ. E. A. & Uganda Nat. Hist. Soc.*, No. 23, pp. 95-104.
1926. "The Birds of Kenya and Uganda." Part III. *Journ. E. A. & Uganda Nat. Hist. Soc.*, No. 25, pp. 29-60.
1930. "The Birds of Kenya and Uganda." Part VIII. *Journ. E. A. & Uganda Nat. Hist. Soc.*, Nos. 38-39, pp. 34-65, pls.
1931. "Catalogue of the European and Asiatic Migrants to Kenya and Uganda with brief outline of the subject of Migration of Birds." *Spec. Supp. No. 4 to Journ. E. A. & Uganda Nat. Hist. Soc.* October, 1931, pp. 1-40.
1932. "Birds of Kenya and Uganda, being addenda and corrigenda to my previous paper in "Novitates Zoologicae", XXIX, 1922." *Novit. Zool.*, **32**, pp. 252-380, pls. i-iv.

WETMORE, ALEXANDER

1930. "A Systematic Classification for the Birds of the World." *Proc. U. S. Nat. Mus.*, **76**, Art. 24, pp. 1-8.
1934. "A Systematic Classification for the Birds of the World, Revised and Amended." *Smiths. Misc. Coll.*, **89**, No. 13, p. 1-11.

EXPLANATION OF PLATES

PLATE 1

PLATE 1

FIG. 1. FOREST AT SIPI, MOUNT ELGON, UGANDA.

Gunbearer ascending to hole from whence a Gelo River Crowned Hornbill (*Lophoceros melanoleucos geloensis*) had flown. December 21, 1933. Photo M. V. Loveridge.

FIG. 2. WEAVER (*Ploceus cucullatus feminina*) COLONY.

These nests were in an acacia overhanging a stagnant pool at Kananyait, western foot of Mount Debasien, Karamoja. December 3, 1933. Photo M. V. Loveridge.



1



2



PLATE 2

PLATE 2

FIG. 1. NEST AND EGGS OF GOLDEN-BREASTED BUNTING.

This bird (*Emberiza flaviventris flaviventris*) had built among the four-inch thorns of a dry acacia, Mount Debasien. November 25, 1933. Photo M. V. Loveridge.

FIG. 2. MOUNT DEBASIEEN FROM THE WEST.

This mountain, whose rocky summit attains an altitude of about 10,050 feet, is situated in the vast dessicating region of Karamoja. Forest-loving birds are only to be found along the river beds and in the small remnant of forest nestling against the rocky heights. November, 1933. Photo M. V. Loveridge.



1



2

11.5.25

Bulletin of the Museum of Comparative Zoölogy

AT HARVARD COLLEGE

VOL. LXXIX, No. 5

SCIENTIFIC RESULTS OF AN EXPEDITION
TO RAIN FOREST REGIONS IN EASTERN AFRICA

V

REPTILES

BY ARTHUR LOVERIDGE

WITH NINE PLATES

CAMBRIDGE, MASS., U.S.A.

PRINTED FOR THE MUSEUM

NOVEMBER, 1936

No. 5. — *Reports on the Scientific Results of an Expedition
to Rain Forest Regions in Eastern Africa*

V

Reptiles

BY ARTHUR LOVERIDGE

CONTENTS

| | PAGE |
|---|------|
| INTRODUCTION | |
| Material | 209 |
| Acknowledgements | 210 |
| Additions to the Fauna | 211 |
| Summary of taxonomic alterations | 212 |
| List and index to species collected | 213 |
| SYSTEMATIC DISCUSSION | |
| Crocodiles | 217 |
| Chelonians | 218 |
| Snakes | 225 |
| Lizards | 281 |
| Chameleons | 329 |
| BIBLIOGRAPHY | 336 |

INTRODUCTION

The collection on which this report is based was made by the author, as a Fellow of the John Simon Guggenheim Foundation, with a view to elucidating the present-day distribution of the montane, sylvicoline fauna of certain mountains in eastern Uganda and Kenya Colony.

This subject will be dealt with in the concluding contribution to the series of reports, in a paper which will also contain the itinerary and full information regarding localities and altitudes.

The period of collecting was from November 8, 1933, to July 9, 1934, during which time 2,280 reptiles representing 123 species were preserved. This total, which excludes certain species received as a gift, comprises 1 species of crocodile, 5 of tortoises and turtles, 57 of snakes, 50 of lizards and 10 forms of chameleons. In all 18 of these and 1 genus were new to the collections of the Museum of Comparative Zoölogy,

but a dozen others were previously represented by only 1 or 2 examples sometimes with poor data.

One might single out for special mention such rarities as: *Leptotyphlops boulengeri*, *Mehelya nyassae*, *Chamaetortus a. aulicus*, *Rhamphiophis rubropunctatus*, *Micrelaps bicoloratus*, *Bunocnemis modestus*, *Lygodactylus f. scheffleri*, *Geocalamus acutus*, *Eremias neumanni*, *Mabuya irregularis*, *Chameleon tavetensis*. Five of these were known previously only from the type. In all, topotypes of more than a score of species were collected.

Originally I had planned to visit the Sokoki Forest, on the coast south of Malindi. As, however, that veteran collector and well-known naturalist, Mr. H. J. Allen Turner, camped there in June, 1932, I availed myself of his typically generous offer to work over the herpetological material (now in the Coryndon Memorial Museum, Nairobi) which he had secured. The resulting locality records are included under the heading "Distribution," but his specimens do not figure in the statistics given above.

ACKNOWLEDGMENTS

I should like to take this opportunity to express my gratitude to the John Simon Guggenheim Memorial Foundation for the grant which made the expedition possible. Also to Dr. Thomas Barbour, of the Museum of Comparative Zoölogy, for the interest and encouragement he has given in furthering the prosecution of this work.

As before, I am indebted to Doctors Joseph Bequaert and J. H. Sandground of the Harvard School of Tropical Medicine for identifying the ecto- and endoparasites recorded in the following pages. My entomological colleague, Mr. Nathan Banks, has been most kind in determining the more difficult remains of insects which figured in the stomach contents of these reptiles.

Many herpetologists and others have aided by answering questions, making comparisons with types in their care, and in other ways. Due appreciation is expressed in the text, but I may mention here that Messrs. E. R. Dunn, Malcolm A. Smith, H. W. Parker, C. R. S. Pitman, K. P. Schmidt, O. G. Stull-Davies and V. G. L. van Someren have all assisted at one time or another during the writing up of these notes.

Lastly, but by no means least, I am grateful to my wife for taking all the photographs used to illustrate this paper. Many were taken under trying conditions of heat, tropical glare, and often with restless reptilian subjects.

ADDITIONS TO THE FAUNA

As a result of this study, the following species, or races, collected on the expedition, have been described for the first time:

- Testudo pardalis babcocki*, Mount Debasien, Uganda.
Typhlops kaimosae, Kaimosi, Kenya Colony.
Coronella semiornata fuscrosea, Mount Mbololo, Kenya Colony.
Aparallactus turneri, Sokoki Forest, Kenya Colony.
Dendraspis jameson kaimosae, Kaimosi, Kenya Colony.
Cnemaspis africanus elgonensis, Sipi, Mount Elgon, Uganda.
Hemidactylus mandensis Kitau, Manda Id., Kenya Colony.
Lygodactylus picturatus mombasicus, Kilindini, Mombasa Id., Kenya Colony.
Agama agama kaimosae (see below), Near Kaimosi, Kenya Colony.
Riopa mabuiiformis, Ngatana, Tana River, Kenya Colony.
Riopa tanae, Kau, Tana River, Kenya Colony.
Acontias percivali, Foot of Mount Mbololo, Kenya Colony.
Chamaeleon bitaeniatus altaeelgonis, Kaburomi, Mt. Elgon, Uganda.

In addition to these new forms, the undermentioned are recorded from Uganda or Kenya Colony for the first time:

New for Uganda

- Chlorophis carinatus* Andersson, of Cameroons.
Cnemaspis quattuorseriatus (Sternfeld), of Ruanda.
Algiroides alleni Barbour, of Kenya Colony.
Eremias spekii sextaeniata Stejneger, of Kenya Colony.
Mabuya irregularis Lönnberg, of Kenya Colony.

New for Kenya Colony

- Kinixys spekii* Gray, of "Central Africa."
Typhlops pallidus (Cope), of Zanzibar.
Leptotyphlops longicauda (Peters), of Mozambique.
Mehelya nyassae (Günther), of Nyasaland.
Chlorophis carinatus Anderson, of Cameroons.
Coronella coronata (Schlegel), of the Gold Coast.
Prosymna ambigua stuhlmanni (Pfeffer), of Tanganyika Territory.

Aparallactus uluguruensis Barbour and Loveridge, of Tanganyika Territory.

Zonurus tropidosternum Cope, of Tanganyika Territory.

Eremias neumanni Tornier, of Ethiopia.

The genera *Prosymna* and *Zonurus* have their ranges extended northwards into Kenya, though the former is known to occur in British Somaliland.

SUMMARY OF TAXONOMIC ALTERATIONS

The following subspecies are revived from the synonymy of their respective species:

Prosymna ambigua stuhlmanni, (Pfeffer).

Lygodactylus fischeri scheffleri, Sternfeld.

Mabuya quinquetaeniata obsti, Werner.

Parker was correct in treating *Riopa modestum* as a full species, and I was in error in assuming it to be a race of *R. sundevallii* (Smith). *Chamaeleon tarcensis* Steindachner becomes a race of *fischeri*.

The undermentioned are considered to be synonyms:

| | |
|--|--|
| <i>Kinixys jordani</i> Hewitt | = <i>Kinixys spekii</i> Gray |
| <i>Pelusios sinuatus zuluensis</i> Hewitt | = <i>Pelusios sinuatus</i> (Smith) |
| <i>Pelusios sinuatus leptus</i> Hewitt | = <i>Pelusios sinuatus</i> (Smith) |
| <i>Typhlops Boulengeri</i> Bocage | = <i>Typhlops p. punctatus</i> (Leach) |
| <i>Glauconia braueri</i> Sternfeld | = <i>Typhlops braminus</i> (Daudin) |
| <i>Meizodon regularis</i> Fischer | = <i>Coronella coronata</i> (Schlegel) |
| <i>Coronella regularis praeornata</i> Angel | = <i>Coronella coronata</i> (Schlegel) |
| <i>Coronella semiornata mossambicae</i> Cott | = <i>Coronella s. semiornata</i> Peters |
| <i>Scaphiophis calciatii</i> Calabresi | = <i>Scaphiophis raffreyi</i> Bocourt |
| <i>Rhinocalamus meleagris</i> Sternfeld | = <i>Micrelaps bicoloratus</i> Sternfeld |
| <i>Aparallactus concolor Boulengeri</i> | |
| Scortecci | = <i>A. uluguruensis</i> Barb. & Love. |
| <i>Dendraspis sjöstedtii</i> Lönnberg | = <i>Dendraspis angusticeps</i> (Smith) |
| <i>Agama agama turuensis</i> Loveridge | = <i>Agama agama elgonis</i> Lönnberg |
| <i>Agama agama kaimosae</i> Loveridge | = <i>Agama planiceps caudospinosa</i> Meek |
| <i>Zonurus parkeri</i> Cott | = <i>Zonurus tropidosternum</i> Cope |
| <i>Euprepes (Euprepis) taitanus</i> Peters | = <i>Mabuya planifrons</i> (Peters) |
| <i>Ablepharus carsonii</i> Boulenger | = <i>Ablepharus wahlbergii</i> (Smith) |

LIST OF SPECIES COLLECTED*

| | |
|---|------|
| CROCODYLIDAE | Page |
| <i>Crocodylus niloticus</i> Laurenti. | 217 |
| TESTUDINIDAE | |
| <i>Kinixys spekii</i> Gray. | 218 |
| <i>Testudo pardalis babcocki</i> Loveridge. | 220 |
| (<i>Testudo tornieri</i> Siebenrock). | 221 |
| CHELONIIDAE | |
| <i>Chelonia mydas</i> (Linnaeus). | 221 |
| PELOMEDUSIDAE | |
| <i>Pelusios sinuatus</i> (Smith). | 222 |
| <i>Pelusios nigricans nigricans</i> (Dondorff). | 223 |
| <i>Pelomedusa galeata</i> (Schoepff). | 225 |
| TYPHLOPIDAE | |
| (<i>Typhlops punctatus punctatus</i> (Leach)). | 225 |
| <i>Typhlops kaimosae</i> Loveridge. | 226 |
| <i>Typhlops schlegelii mucroso</i> (Peters). | 226 |
| <i>Typhlops unitaeniatus unitaeniatus</i> Peters. | 227 |
| <i>Typhlops pallidus</i> (Cope). | 227 |
| (<i>Typhlops braminus</i> (Daudin)). | 228 |
| <i>Typhlops lumbriciformis</i> (Peters). | 228 |
| LEPTOTYPHLOPIDAE | |
| <i>Leptotyphlops boulengeri</i> (Boettger). | 230 |
| <i>Leptotyphlops longicauda</i> (Peters). | 231 |
| <i>Leptotyphlops conjuncta</i> (Jan). | 232 |
| BOIDAE | |
| <i>Python sebae</i> (Gmelin). | 232 |
| <i>Eryx colubrinus loveridgei</i> Stull. | 233 |
| (<i>Eryx colubrinus rufescens</i> Ahl). | 235 |
| COLUBRIDAE | |
| <i>Natrix olivacea olivacea</i> (Peters). | 236 |
| <i>Boaedon lineatus</i> Duméril & Bibron. | 237 |
| (<i>Boaedon olivaceus</i> (Duméril)). | 240 |
| <i>Lycophidion capense capense</i> (Smith). | 241 |
| <i>Lycophidion capense acutirostre</i> Günther. | 242 |

*Species in parentheses are discussed, though not collected.

| | |
|---|------|
| COLUBRIDAE continued | Page |
| <i>Mehelya nyassae</i> (Günther) | 243 |
| <i>Chlorophis carinatus</i> Andersson | 243 |
| <i>Chlorophis hoplogaster</i> (Günther) | 245 |
| <i>Chlorophis neglectus</i> (Peters) | 246 |
| <i>Chlorophis irregularis</i> (Peters) | 247 |
| <i>Philothamnus semivariegatus semivariegatus</i> Smith | 247 |
| <i>Hapsidophrys lineata</i> Fischer | 249 |
| <i>Thrasops jacksonii jacksonii</i> Günther | 249 |
| <i>Coronella semiornata semiornata</i> Peters | 250 |
| <i>Coronella semiornata fuscorosea</i> Loveridge | 252 |
| <i>Coronella coronata</i> (Schlegel) | 253 |
| <i>Prosymna ambigua stuhlmanni</i> (Pfeffer) | 254 |
| <i>(Scaphiophis albopunctatus</i> Peters) | 255 |
| DASYPELTINAE | |
| <i>Dasypeltis scaber</i> Linnaeus | 256 |
| BOIGINAE | |
| <i>Crotaphopeltis hotamboeia hotamboeia</i> (Laurenti) | 257 |
| <i>Chamaetortus aulicus aulicus</i> Günther | 259 |
| <i>Hemirhagerrhis kelleri</i> Boettger | 260 |
| <i>Rhamphiophis rubropunctatus</i> (Fischer) | 261 |
| <i>Rhamphiophis rostratus</i> Peters | 262 |
| <i>Psammophis sibilans</i> (Linnaeus) | 262 |
| <i>Psammophis subtaeniatus</i> Peters | 263 |
| <i>Psammophis punctulatus</i> Duméril & Bibron | 264 |
| <i>Psammophis biseriatus</i> Peters | 265 |
| <i>Thelotornis kirtlandii</i> (Hallowell) | 265 |
| <i>Dispholidus typus</i> (Smith) | 266 |
| <i>Calamelaps unicolor</i> (Reinhardt) | 266 |
| <i>Micrelaps bicoloratus</i> Sternfeld | 267 |
| <i>Aparallactus turneri</i> Loveridge | 268 |
| <i>Aparallactus capensis</i> Smith | 268 |
| <i>Aparallactus concolor</i> (Fischer) | 269 |
| <i>Aparallactus uluguruensis</i> Barbour & Loveridge | 270 |
| ELAPINAE | |
| <i>Elapsoidea güntherii</i> Bocage | 271 |
| <i>Naja melanoleuca</i> Hallowell | 271 |
| <i>Naja nigricollis nigricollis</i> Reinhardt | 272 |
| <i>Dendraspis jamesoni kaimosae</i> Loveridge | 273 |
| <i>Dendraspis angusticeps</i> (Smith) | 273 |

VIPERIDAE

Page

| | |
|--|-----|
| <i>Causus resimus</i> (Peters) | 277 |
| <i>Causus deflippii</i> (Jan) | 278 |
| <i>Causus lichtensteinii</i> (Jan) | 278 |
| <i>Bitis arietans</i> (Merrem) | 278 |
| <i>Bitis nasicornis</i> (Shaw) | 279 |
| <i>Atheris squamigera</i> (Hallowell) | 280 |
| <i>Atractaspis bibronii</i> Smith | 280 |
| <i>Atractaspis microlepidota</i> Günther | 281 |

GEKKONIDAE

| | |
|--|-----|
| <i>Cnemaspis africanus africanus</i> (Werner) | 281 |
| <i>Cnemaspis africanus elgonensis</i> Loveridge | 282 |
| <i>Cnemaspis quattuorseriatus</i> (Sternfeld) | 283 |
| <i>Hemidactylus brookii</i> Gray | 284 |
| <i>Hemidactylus mandanus</i> Loveridge | 285 |
| <i>Hemidactylus mabouia</i> (Moreau de Jonnés) | 285 |
| <i>Hemidactylus persimilis</i> Barbour & Loveridge | 286 |
| <i>Hemidactylus frenatus</i> Duméril & Bibron | 286 |
| <i>Hemidactylus werneri werneri</i> Tornier | 286 |
| <i>Hemidactylus tropidolepis squamulatus</i> Tornier | 287 |
| <i>Bunocnemis modestus</i> Günther | 287 |
| <i>Lygodactylus fischeri scheffleri</i> Sternfeld | 288 |
| <i>Lygodactylus picturatus picturatus</i> (Peters) | 289 |
| <i>Lygodactylus picturatus mombasicus</i> Loveridge | 289 |
| <i>Lygodactylus picturatus gutturalis</i> (Bocage) | 290 |

AGAMIDAE

| | |
|---|-----|
| <i>Agama rueppelli septentrionalis</i> Parker | 291 |
| <i>Agama agama agama</i> (Linnaeus) | 291 |
| <i>Agama agama elgonis</i> Lönnberg | 292 |
| <i>Agama agama lionotus</i> Boulenger | 293 |
| <i>Agama planiceps caudospinosa</i> Meek | 294 |
| <i>Agama atricollis</i> Smith | 295 |

ZONURIDAE

| | |
|--|-----|
| <i>(Zonurus tropidosternum</i> Cope) | 296 |
| <i>Chamaesaura tenuior</i> Günther | 297 |

VARANIDAE

| | |
|---|-----|
| <i>Varanus ocellatus</i> Rüppell | 298 |
| <i>Varanus niloticus</i> (Linnaeus) | 299 |

AMPHISBAENIDAE

| | |
|--|-----|
| <i>Geocalamus acutus</i> Sternfeld | 300 |
|--|-----|

| LACERTIDAE | Page |
|---|------|
| <i>Lacerta jacksoni</i> Boulenger. | 300 |
| <i>Algiroides alleni</i> Barbour. | 302 |
| <i>Latastia longicaudata revoili</i> (Vallant). | 304 |
| <i>Eremias neumanni</i> Tornier. | 305 |
| <i>Eremias spekii spekii</i> Günther. | 306 |
| <i>Eremias spekii sexaeniata</i> Stejneger. | 307 |
| GERRHOSAURIDAE | |
| <i>Gerrhosaurus major major</i> Duméril. | 308 |
| <i>Gerrhosaurus flavigularis flavigularis</i> Wiegmann. | 309 |
| SCINCIDAE | |
| <i>Mabuya maculilabris</i> (Gray). | 310 |
| <i>Mabuya planifrons</i> (Peters). | 311 |
| <i>Mabuya brevicollis</i> (Wiegmann). | 313 |
| <i>Mabuya megalura</i> (Peters). | 315 |
| <i>Mabuya quinquetaeniata obsti</i> Werner. | 315 |
| <i>Mabuya varia varia</i> (Peters). | 316 |
| <i>Mabuya striata</i> (Peters). | 318 |
| <i>Mabuya irregularis</i> Lönnberg. | 319 |
| <i>Riopa mabuiiformis</i> Loveridge. | 320 |
| <i>Riopa tanae</i> Loveridge. | 320 |
| <i>Riopa sundervallii</i> (Smith). | 321 |
| <i>Riopa modestum modestum</i> (Günther). | 322 |
| (<i>Riopa pambanum</i> (Boettger)). | 323 |
| <i>Riopa anchietae</i> (Bocage). | 323 |
| <i>Siaphós kilimensis</i> (Stejneger). | 324 |
| <i>Ablepharus boutonii africanus</i> Sternfeld. | 326 |
| <i>Ablepharus wahlbergii</i> (Smith). | 327 |
| <i>Acontias percivali</i> Loveridge. | 328 |
| CHAMAELEONTIDAE | |
| <i>Chamaeleon senegalensis</i> Daudin. | 329 |
| <i>Chamaeleon gracilis gracilis</i> Hallowell. | 329 |
| <i>Chamaeleon dilepis roperi</i> Boulenger. | 330 |
| <i>Chamaeleon dilepis quilensis</i> Bocage. | 331 |
| <i>Chamaeleon dilepis dilepis</i> Leach. | 331 |
| <i>Chamaeleon bitaeniatus bitaeniatus</i> Fischer. | 333 |
| <i>Chamaeleon bitaeniatus höhnelii</i> Steindachner. | 333 |
| <i>Chamaeleon bitaeniatus altaeagonis</i> Loveridge. | 334 |
| <i>Chamaeleon fischeri tavetensis</i> Steindachner. | 335 |
| <i>Brookesia kerstenii kerstenii</i> (Peters). | 335 |

Systematic List of Species Collected

CROCODYLIDAE

CROCODYLUS NILOTICUS Laurenti

Crocodylus niloticus Laurenti (part), 1768, Syn. Rept., p. 53: "Habitat in India orientali, et Aegypto."

2 (M. C. Z. 40001-2) between Kau and Kipini, K. C. 7.v.34.

Native name. Ngwena (Kipokomo).

Measurements. Snout to anus 550 and 510 mm., tail 565 and 540 mm., hind limb 207 and 202 mm., weight 10 and 8 lbs. A third example weighed 13 lbs.

Diet. These young crocodiles had been kept in captivity for some years and were fed upon fish and meat in a tank at Lamu. I was asked to shoot them as they were snapping at their native custodian who had become afraid of them. A shot with a .22 bullet at close quarters killed them instantly and did not injure the slate bottom of their tank.

The Wapokomo told me that when the Tana is in flood the crocodiles get plenty of fish and consequently do not carry off so many humans as at other seasons. Nevertheless, just before my arrival at Ngau, a native, who had been standing six feet from the water's edge up-river, was seized by the leg by a crocodile which dashed out of the water and dragged him back into the river. Fortunately for the man, he retained hold of his spear, and by stabbing the reptile three or four times persuaded it to let go its hold. The man, with his leg badly mangled, was still in the mission hospital at Ngau. I was also told that the previous year a crocodile had risen from the water and snapped at the arm of an Englishman who was descending the river in a dugout; the reptile only succeeded in tearing away the man's sleeve.

Parasites. None.

Enemies. An Mpokomo informed me that when the river subsides his people organize hunts and spear many scores of crocodiles in the course of a day, usually a few monsters but the majority of small size. In former years a Mpokomo youth had to kill a crocodile before he could marry. They claim to eat all of the reptiles except the bones and skin of the back. I expressed doubts as to their being able to eat the skin of the belly, but was told that after boiling it for a long time they chewed off pieces and swallowed them.

Six vultures (*Necrosyrtes m. monachus*) gathered about the carcasses

of the three crocodiles skinned at Lamu, but for some unfathomed reason refused to touch them. The boys suggested that it was because they smelled like fish.

TESTUDINIDAE

KINIXYS SPEKII Gray

Kinixys Spekii Gray, 1863, Ann. Mag. Nat. Hist. (3), 12, p. 381: Central Africa (*i.e.* Tanganyika Territory east of the lakes).

Kinixys jordani Hewitt, 1931, Ann. Natal Mus., 6, p. 482, pl. xxxvii, figs. 7-9 (not figs. 1-3 as stated in text): Isoka, Northern Rhodesia.

♂ & Young (M. C. Z. 40007-8) Kibwezi, K. C. 23-28.iii.34.

2 ♂ 6 ♀ (M. C. Z. 40009-16) Voi, K. C. 9-13.iv.34.

♂ (M. C. Z. 40017) Golbanti, K. C. 22.vi.34.

Native names. *Nguru* (Kisagalla and Kitaita); *fudi* (Kipokomo).

Variation. We have in the Museum of Comparative Zoölogy a ♂ and ♀ box tortoise from Simbo a few miles north of Tabora (Unyamwebe), Unyamwezi, Tanganyika Territory. These may well be considered as topotypes of *spekii* coming as they do from a village on the probable route which Speke took when he first descried Lake Victoria.

When encountered, I was struck by their depressed appearance and planned describing them as distinct from *belliana* with which I was familiar. I took the precaution, however, of first submitting them to the British Museum. I was then informed by the late Miss J. Procter that they were within the range of variation of *belliana* to the synonymy of which Boulenger had already referred the injured type of *spekii*. I therefore discussed them (Loveridge, 1923, p. 924) under the name of *belliana* as a depressed form inhabiting the arid thorn-bush country as opposed to *belliana* with a more vaulted carapace living in the grassy steppes.

More recently Hewitt (1931, *loc. cit.*) described five new members of the genus from South Africa. Two as races of *belliana*, three as species of the depressed (*i.e.* *spekii*) group. He very kindly sent me a paratype of *jordani* which so closely resembles the ♂ topotype of *spekii* that I have no hesitation in referring it to the synonymy of that form. Hewitt mentions a specimen from "Gatta Plain, British East Africa" (*i.e.* Yatta Plain, Kenya Colony), which he says resembles *jordani* and *australis*, but differs in certain ways which he enumerates. His later (1935, p. 347) remarks are rendered nugatory by the second Simbo specimen.

First let us reduce the vague terms "slightly flattened," "more depressed" to actual percentages of greatest height contained in greatest length. In most of the series it was possible to take these by placing the tortoise between two blocks. Arranging our material from south to north we find:—

| | | |
|--|--------------------------------|---|
| M. C. Z. 33450 paratype shell of <i>jordani</i> . | Height 2.6 times in the length | |
| M. C. Z. 18154-5 ♂, ♀ topotypes of <i>spekii</i> . | " 2.4 | " |
| M. C. Z. 40009-16 being 2 ♂, 6 ♀ from Voi. | " 2.3-2.5 | " |
| M. C. Z. 40017 a young ♂ from Golbanti. | " 2.2 | " |
| M. C. Z. 40007-8 young and ♂ from Kibwezi. | " 2.2-2.4 | " |
| M. C. Z. 8158 a juvenile ♀ from Ithanga Hills. | " 2.0 | " |

Sex has no bearing on this variation in height in relation to length but age is very obviously a factor for all the four instances of 2 to 2.2 times the data is based on juveniles which are under 100 mm. in length while all the rest of our series are 100 mm. or over and furnish a ratio of 2.3 to 2.6 times for height included in length.

The width of the nuchal may be included in the width of the adjacent marginal from $3\frac{1}{4}$ (M.C.Z. 40010) to 7 (M.C.Z. 40015) times in the *Voi* series alone.

Great extremes of variation in the amount of projection of the gulars in females is shown.

Marginal VI is narrowly in contact with the inguinal in the paratype of *jordani* (M.C.Z. 33450), topotypes of *spekii* (M.C.Z. 18154-5), Ithanga Hills specimen (M.C.Z. 8158) but only in one of the *Voi* series (M.C.Z. 40014). In all others it is broadly in contact.

The anal suture may be only half the length of the femoral suture (M.C.Z. 40017) or three times as long (M.C.Z. 40013). In the topotypic pair of *spekii* alone it is much longer or much shorter!

My conclusion, therefore, is that the characters on which the alleged species *jordani*, *australis* and *youngi* were based are subject to infinite variation. I definitely refer *jordani* to the synonymy of *spekii* and imagine that when a good series of topotypic *australis* and *youngi* are available it will be found that they cannot be maintained as distinct.

Coloration. The plastrons of the *spekii* topotypes as well as that of the *jordani* paratype exhibit well-defined hollow squares of black pigmentation corresponding to the contours of the shields, evidently of little consequence as differing somewhat from the types of *jordani* as described by Hewitt. In the Kibwezi, Voi and Golbanti tortoises this definite marking is obsolescent though indicated by fragmentary

markings of a deep black tone. The juvenile female from the Ithanga Hills has traces of a stellar pattern in the black markings of its plastron. The rich pattern of the carapace is so variable in the females, often only dull olive in the males, that it can serve no useful purpose to describe it here.

Measurements. Largest ♂ (M.C.Z. 40007) measures 150 mm. in total length, 62 mm. in height; largest ♀ (M.C.Z. 40011) measures 180 mm. in length, 72 mm. in height. Smallest tortoise (M.C.Z. 40008) measures 53 mm. and 24 mm. respectively.

Sex. Males may be readily distinguished by their slightly concave plastrons and their very long tails.

Diet. A male was observed feeding beside the road at 10 a.m. in bright sunshine. On being approached, he turned and made off into the bush with surprising agility.

TESTUDO PARDALIS BABCOCKI Loveridge

Plate 1, figs. 1 and 2

Testudo pardalis babcocki Loveridge, 1935, Bull. Mus. Comp. Zoöl., **79**, p. 4: Mount Debasien, Karamojo, Uganda.

Type ♀ (M. C. Z. 40003) Mt. Debasien, U. 23.xi.33.

♀ & young (M. C. Z. 40004-5) Mt. Mbololo, K. C. 17.iv.34.

8 eggs (M. C. Z. 40018) Mt. Mbololo, K. C. 17.iv.34.

♂ (M. C. Z. 40006) Wema, Ngatana, K. C. 17.vi.34.

Distribution. This species has also been taken at Kaimosi by Heller.

Affinities. In 1933 Hewitt proposed separating this species from *Testudo* under the name *Megachersine*.

Native names. *Akuma* (Karamojong); *ikudu* (Lugishu); *Likudu* (Luragoli and Lutereki); *nguru* (Kitaita, but not specific).

Measurements. Greatest length of ♂ (M.C.Z. 40006) 238 mm., of ♀ (M.C.Z. 40004) 385 mm., and of young (M.C.Z. 40005) 58 mm.

Breeding. From the oviducts of the female taken on Mt. Mbololo, April 17, 1934, I removed and blew eight eggs. These eggs measured 38 x 36 mm. in diameter and were noticeably larger than the seven eggs, measuring 35 x 32.5 mm., laid on May 21, 1922 by a tortoise from Pwaga, Tanganyika Territory (*vide* Loveridge, 1923, p. 927). In addition to the eggs removed there were the usual developing ova of various sizes in the ovaries.

Parasites. Ticks (*Amblyomma exornatum*) were removed from the neck and limbs of the Mt. Mbololo and Wema tortoises.

Enemies. In addition the latter had very many heads of *siafu* or soldier ants (*Dorylus nigricans* subsp.) attached to it.

From the shell of the big Mbololo female, it would appear as if a hyena or other carnivore had attempted to crack the shell by biting it when the reptile was of smaller size. The carapace has an injured area on its summit while the plastron has a corresponding mark where it has been perforated (by a canine?). It is interesting to note how the hole has been repaired from the inside by a bony growth, parallelling the repairs carried out on an oyster shell by its occupant.

Habitat. The Debasien tortoise was taken among rocks on an arid ridge or spur of the mountain at an altitude of 5,000 feet. The young Mbololo specimen was found at 4,000 feet, the adult rather lower down the mountain. The Wema reptile was inhabiting the plains fringing the north bank of the Tana River which could not have been more than 1,000 feet above sea level. The name of Leopard Tortoise, therefore, seems preferable to Mountain Tortoise by which it is sometimes known in South Africa.

TESTUDO TORNIERI Siebenrock

Testudo tornieri Siebenrock, 1903, Ak. Wiss. Wien, Math.-nat. Klasse, **24**, p. 185: "Bussisia" i.e. Busisi, Tanganyika Territory.

1 young (Nairobi Mus.) Sokoki Forest, nr. Malindi, K. C. (H.J.A.T.) 1932.

Distribution. This specimen, which I examined when passing through Nairobi, constitutes a most interesting extension of range for the soft-shelled land tortoise. On October 14, 1934, Mr. Allen Turner wrote to me stating that this specimen "was caught by a boy while cleaning round his rice plants about a hundred yards from my camp at the top of Mida Creek about ten miles south of Malindi." This unusual habitat for a species usually associated with rocky hills in arid regions, is also quite a surprise.

CHELONIIDAE

CHELONIA MYDAS (Linnaeus)

Testudo mydas Linnaeus, 1758, Syst. Nat. ed. **10**, p. 197: Ascension Island, Atlantic Ocean.

Testudo japonica Thunberg, 1787, Sven. Vet.-Akad. Handl., **8**, p. 178, pl. vii: Japan.

♂ (M. C. Z. 40019) Lamu, Lamu Id., K. C. 7.v.34.

Native name. *Kasa* (Kiamu.)

Measurements. Length over all of carapace 710 mm.

Diet. Stomach full of sea grass but free of parasites.

PELOMEDUSIDAE

PELUSIOS SINUATUS (Smith)

Sternothaerus sinuatus A. Smith, 1838, Illus. Zool. S. Africa, **3**, pl. i: South Africa, "in rivers to the north of 25° S. latitude." (*i.e.* region of the headwaters of the Limpopo River.)

Pelusios sinuatus zuluensis Hewitt, 1927, Rec. Albany Mus., p. 360, pl. xx, figs. 1-3, text fig. 1d; near Umsinene River, Zululand.

Pelusios sinuatus leptus Hewitt, 1933, Occ. Pap. Rhodesian Mus., p. 1, pl. ix, fig. 1: Isoka, northeast Northern Rhodesia.

♀ ♀ (M. C. Z. 40020, 40050) Tsavo River, K. C. 2-3.iv.34.

Variation. These two large terrapin, taken from the river at almost the same spot, exhibit striking variation in almost every character which Hewitt thought to be of importance in differentiating the race *zuluensis*. They bear out my previous observations (Loveridge, 1929, p. 15 and 1933, p. 208) based on material from Ujiji, Tanganyika Territory and Mount Chirinda (Selinda), Southern Rhodesia.

The more important variations of the Tsavo females are as follows. Vertebrae I to IV exhibit a protruberance (M.C.Z. 40020) or are perfectly smooth (40050); vertebrae II to IV are much longer than broad (40020) or as long as broad or very slightly longer (40050); outer border of the pectoral is shorter than that of the humeral (40020) or the outer border of the pectoral is longer than that of the humeral (40050); the intergular is not twice as long as broad (40020, whose intergular is 37 mm. long, 26 mm. broad) or the intergular is more than twice as long as broad (40050, whose intergular is 37 mm. long, 15 mm. broad); the lateral gulars very small, the anterior edge of one (9 mm.) being included at least $2\frac{1}{2}$ times in that (24 mm.) of the intergular (40020) or the lateral gulars relatively large, the anterior edge of one (11 mm.) being included less than $1\frac{1}{2}$ times in that (15 mm.) of the intergular (40050); the sides may be steeply sloping (40020) or more gradually so (40050); the relative lengths of the claws of the hind feet, being subject to growth and wear, is not comparable on the right and left feet of either terrapin.

Coloration. The plastron of the smaller has the characteristic yellow

centre sharply defined from the black border; in the larger specimen the juncture of the two colors is blurred.

Measurements. M.C.Z. 40020 measures 285 mm. in outside length of shell, 95 mm. in greatest depth. The smaller terrapin measures 227 mm. in length and 80 mm. in depth. This gives a depth into length of 3 and 2.8 times respectively, the four young specimens from Tanganyika and Southern Rhodesia ranged from 80 to 88 mm. in length in which the depth was included from 2.4 to 2.5 times.

PELUSIOS NIGRICANS NIGRICANS (Dondorff)

Plate 2, figs. 1 and 2

Testudo nigricans Dondorff, 1798, Zoöl. Beytr. des Linn. natur., 3, p. 34: Type locality unknown.

34 (M. C. Z. 40021-40049) Kaimosi, K. C. 13.ii-10.iii.34.

Native names. *Likudu* (Luragoli); *lihodu* (Lutereki).

Variation. This long series was secured to see if any embraced the proportions of *P. n. castanoides* Hewitt which was based on a single individual from Richard's Bay, Zululand. This type measured 225 mm. in length and 98 mm. in height, giving a height into length of 2.2. times. While the Kaimosi series actually ranges from 2.17 to 3.30 times this is inconclusive for it is only a 100 mm. terrapin that furnishes the low figure and a 248 mm. specimen that is 3.30 times; a 225 mm. example (No. 40025) has a height of only 75 mm. giving a height into length of 3 times as against 2.2 times in Hewitt's type of *castanoides*. In passing, a few further remarks on the results of measuring these 34 terrapin might be added. Taking the eight largest males (151 to 240 mm.) and eight largest females (168 to 252 mm.) no appreciable difference is found in the ratio of height into length or breadth into length. On the other hand there is a very marked age difference in these proportions, thus

| | 8 young | 8 males | 8 females |
|-----------------------------------|---------|---------|-----------|
| Height is included in the length | 2.1-2.4 | 2.5-3.0 | 2.7-3.1 |
| Breadth is included in the length | 1.2-1.4 | 1.4-1.5 | 1.3-1.5 |

The breadth of *castanoides* was 146 mm., giving a ratio of 1.54 times which can be matched by several of our series of a comparable length.

Hewitt (1931, p. 466) is correct in stating that the intergular shield is pear-shaped and longer than the inner border of the humeral in East African *nigricans*. I notice that the intergular is flat in our

examples of *P. n. rhodesianus* while it is rounded or embossed in these Kaimosi specimens, especially noticeable in the younger individuals. The intergular is always longer than the inner border of the humeral, in 14 reptiles it equals the united lengths of the inner border of humeral and pectoral, in 16 it is even longer, in only 3 is it shorter, 1 terrapin is damaged.

On the other hand, I fail to see that "outer border of femoral strongly arched" is of any diagnostic significance as against "moderately arched" in *castanoides*, or "slightly arched" in *castaneus* (which I treat as a synonym of *nigricans*). The range of variation in this character in the Kaimosi series is enormous and must be seen to be appreciated. They do differ in this character from our examples of *rhodesianus* where they are "not definitely arched."

The outer border of the pectoral is shorter than the outer border of the humeral in 24 specimens, is equal to it in 10, so that, as I have remarked elsewhere, (Loveridge, 1933, p. 209) this key character for distinguishing *sinuatus* and *nigricans* is useless.

Since the foregoing was written, Hewitt (1935, p. 345) has decided to make *rhodesianus* a full species, because he has seen an example of it from Entebbe, Uganda, where *nigricans* is common. The greater probability is that *rhodesianus* is a synonym of *nigricans*.

Coloration in life. Underside of a 30 mm. young one. Throat spotted with pink. Plastron peripherally blotched with red alternating with the general black ground color; marginals red and black.

Measurements. Largest ♂ measures 240 mm. in length of shell; biggest ♀ measures 252 mm.; smallest specimen 30 mm.

Breeding. The youngest terrapin alluded to above, was taken on March 1 and appeared to have recently hatched as its abdominal shields were still unhealed.

Diet. Crab's (Potamon sp.) claws and grass occurred in the faeces.

Parasites. Leaches (some have been preserved) were commonly found upon these terrapin.

Enemies. Two terrapin (M.C.Z. 40033, 40035) appeared to have been bitten by hyenas or some other carnivore when younger (both measure 167 mm. in length), one having a piece apparently taken out of its side.

Habits. On February 13 the first rain for months fell between 4.30 and 5.30 p.m. The following morning the first of these reptiles was brought in by a native. Its back caked with mud from which it seemed obvious that the creature had been aestivating. Several others were brought in subsequent to other showers.

When hunting frogs at night with an electric torch, I discovered several of the largest in the series lying in shallow water at the edge of the mill pond, these were successfully netted. Attempts to capture them by setting a turtle trap in the outlet of the mill pond, proved abortive.

PELOMEDUSA GALEATA (Schoepff)

Testudo galeata Schoepff, 1792, Hist. Testud., p. 12, pl. iii, fig. 1: "Habitat in India orientale, Carolina."

3 (M. C. Z. 40051-3) Kirui's village, Kitosh, K. C. 25.i.34.

6 (M. C. Z. 40054-9) Voi, Seyidie Province, K. C. 22.iv.34.

Native name. *Nguru* (Kitosh, but not specific).

Measurements. Largest specimen (M.C.Z. 40055), apparently a female, measures 142 mm., the smallest (M.C.Z. 40053) only 60 mm.

Habitat. The Voi series were taken in a watercourse after a heavy downpour, one of several erratic showers inaugurating the rainy season after a prolonged drought.

TYPHLOPIDAE

TYPHLOPS PUNCTATUS PUNCTATUS (Leach)

Acontias punctatus Leach, 1819, in Bowdich, Miss. Ashantee, p. 493: Fantee, Gold Coast.

Typhlops Boulengeri Bocage, 1893, Journ. Sci. Lisboa (2), 3, p. 117: Quindumbo, interior of Benguela, Angola.

Synonymy. As I failed to secure any *Typhlops* on Mount Elgon, Dr. H. Rendahl of the Royal Swedish Museum, Stockholm, was kind enough to send me for study, the specimen No. 2580, taken on the eastern slopes at about 6,500 feet, by Dr. Hugo Granvik, and referred to as "*Typhlops boulengeri* Bocage?" by Lönnberg (1922, p. 7).

This snake has 29 (not 28) midbody scale-rows; its prefrontal is not more than twice as large as its supraocular, the latter forming a very broad suture with the nasal. Its length is 264 (257 + 7) mm., and diameter 11 mm., the latter being included in the former 24 times. All these are characters of *punctatus*.

I consider, however, that *boulengeri* was based on young (180 to 260 mm.) specimens of *punctatus* in which the prefrontal was slightly developed at the expense of the supraocular. As has been shown elsewhere (Loveridge, 1933, p. 218) in regard to another species, a

more rounded snout is characteristic of the young, the obtusely horizontal edge being a secondary character developed to facilitate burrowing.

TYPHLOPS KAIMOSAE Loveridge

Typhlops kaimosae Loveridge, 1935, Bull. Mus. Comp. Zool., **79**, p. 5: Kaimosi, Nyanza Province, Kenya Colony.

Holotype (M. C. Z. 40060) Kaimosi, K. C. 7.iii.34.

Native names. *Inanyanza* (Luragoli); *mutumbo* (Lutereki).

Diagnosis. Distinguished by the preocular being separated from the upper labials by the ocular forming a broad suture with the nasal beneath it. No other East African Typhlops presents such an arrangement.

TYPHLOPS SCHLEGELII MUCRUSO (Peters)

Onychocephalus mucruso Peters (part), 1854, Monatsb. Akad. Wiss. Berlin, p. 621: Maçanga (i.e. Makanga), Mozambique.

Typhlops mandensis Stejneger, 1893, Proc. U. S. Nat. Mus., **16**, p. 725: Wange, on mainland opposite Manda Island, Kenya Colony.

1 (M. C. Z. 40061) Peccatoni, K. C. 24.v.34.

2 (M. C. Z. 40062-3) Mkonumbi, K. C. 28.v.34.

2 (M. C. Z. 40064-5) Near Witu, K. C. 31.v.34.

3 (M. C. Z. 40066-8) Ngatana, K. C. 14.vi.34.

1 (M. C. Z. 40069) Gongoni, K. C. 27.vi.34.

Distribution. Also 3 from Sokoki Forest (H.J.A.T.).

Native name. *Nyoka vishwa viwili* (Kipokomo).

Synonymy. I suspect that Gunther's (1894, p. 87) record of *T. punctatus* from Mkonumbi was based on a juvenile *mucruso* with rounded snout.

Variation. *T. mandensis* was based on an individual about to slough resulting in the eyes being hidden, this is the case with the Peccatoni and Gongoni snakes. Lake Peccatoni lies about forty miles south of Wange. A detailed discussion on the synonymy of *mucruso* has recently been given (Loveridge, 1933, pp. 216-219).

The nine snakes listed above have: Midbody scale-rows 30-34 (average 32.6); the rostral as seen from above is a little longer than broad in both adult and young; the eye, when visible, is beneath the ocular against the suture between ocular and preocular; the nasals are separated behind the rostral; the nasal suture rests on the first

labial, and not on the second labial which is the distinguishing character of *T. brevis* Scortecci from Kismayu, two hundred miles to the north.

Coloration in life. Young. Above, blue gray, each scale edged laterally with black which results in a lineolate appearance. Below, pinkish white. Adult. Above, black, the centre of each scale with a small buff spot. Below, buff. Numbers 40061 and 40069, being about to slough, are: Above, pale silvery gray or white. Below, pinkish white. In life the Gongoni reptile was noted as being white, or slightly bluish white.

Measurements. Largest snake (M.C.Z. 40064) measures 447 (440 + 7) mm. Diameter at midbody 15 mm. Smallest snake (M.C.Z. 40062) measures 135 (133 + 2) mm. Diameter 5 mm. Diameters included in lengths from 27 to 33 times.

TYPHLOPS UNITAENIATUS UNITAENIATUS Peters

*Typhlops (Letheobia) unitaeniatu*s Peters, 1878, Monatsb. Akad. Wiss. Berlin, p. 205, pl. ii, fig. 5; Taita, Kenya Colony.

2 (M. C. Z. 40079-80) Voi, Taita, K. C. 12.iv.34.

1 (M. C. Z. 40081) Malindi, K. C. 28.vi.34.

Distribution. Voi being at the foot of the Taita Mountains, the specimens from there may well be considered topotypes. Another snake from Kibwezi, K.C. (M.C.Z. 18175) has been utilized for these remarks.

Native name. Ngomo (Kisagalla).

Variation. Midbody scale-rows 22-24; eye, when visible, is beneath the nasal; diameter is included in the length from 61 to 76 times.

Coloration in life. The dorsal band is a beautiful mustard yellow, in sharp contrast to the jet black of the rest of the body.

Measurements. The largest snake (M.C.Z. 18175) measures 380 (376.5 + 3.5) mm. Diameter at midbody 5 mm.

Diet. Termites in the Kibwezi snake, apparently termites in the Malindi specimen.

TYPHLOPS PALLIDUS (Cope)

Letheobia pallida Cope, 1868, Proc. Acad. Nat. Sci. Philad., p. 322; Zanzibar.

4 (M. C. Z. 40075-8) Ngatana, K. C. 14.vi.34.

Distribution. Originally described from Zanzibar, later reported from Pemba Island, the above series from the Tana River constitute

the first record from the mainland. They have been carefully compared with a topotype collected at the same time as the type.

Variation. Midbody scale-rows 22; diameter included in total length 51–73 times (50 in Pemba, 58–60 in Zanzibar specimens); tail into total length 58–98 times, one might suggest possibly 58–64 in males and 92–98 for females but the material is unsexed.

Measurements. The largest (M.C.Z. 40075) measures 185 (183 + 2) mm. It is interesting to note that a snake measuring 152 mm. when just killed, now measures only 147 mm., others measured in the field have contracted in the same way.

Habitat. Under vegetable debris heaped along banks of a rice swamp as described under *Leptotyphlops longicauda*.

TYPHLOPS BRAMINUS (Daudin)

Eryx braminus Daudin, 1803, Hist. Nat. Rept., 7, p. 279: Bengal, India.

Glauconia braueri Sternfeld, 1910, Mitt. Zoöl. Mus. Berlin, 5, p. 69: Bagamoyo, Tanganyika Territory.

Sternfeld based his description of *Glauconia braueri* on a very small snake of 83 mm., which he later amended to 85 mm. The original description was exceedingly brief and did not even state the number of midbody scale-rows. Later the same year, however, in his "Die Schlangen Deutsch-Ostafrikas" (1910, p. 13) he gave the number as 14 which definitely placed the reptile among the Leptotyphlops (*Glauconia auct.*).

Its short tail separated it from all East African Leptotyphlops and agreed rather with the genus Typhlops. This aroused my suspicions so I asked my friend, Mr. Karl P. Schmidt, who was visiting Berlin at the time, if he would kindly reexamine the type. He replied that the tail measurements were correct, but that the midbody scale-rows numbered 20! There is therefore no difference between *braueri* and *braminus*, the latter long known from the East African coast, though rare. It was long ago described from South Africa by Sir A. Smith under the name of *Onychocephalus capensis*.

TYPHLOPS LUMBRICIFORMIS (Peters)

Onychocephalus (Letheobia) lumbriciformis Peters, 1874, Monatsb. Akad. Wiss. Berlin, p. 377: Zanzibar coast.

Typhlops kleebergi Werner, 1904, Zoöl. Anz., 27, p. 464: Usambara, Tanganyika Territory.

- 1 (M. C. Z. 39951) Sokoki Forest, K. C. vi.32. H.J.A.T.
- 1 (M. C. Z. 40070) Mkonumbi, K. C. 30.v.34.
- 1 (M. C. Z. 40071) Gongoni, K. C. 27.vi.34.
- 3 (M. C. Z. 40072-4) Malindi, K. C. 29.vi.34.

Distribution. All these specimens were taken on the coast between Lamu and Mombasa and are therefore topotypes in the sense that this region formed part of the Zanzibar coast. As Hildebrandt collected the types it is more probable that they came from nearer Mombasa.

Variation. Midbody scale-rows 18; eyes hidden, but the pigment may be detected beneath the nasal in some; preocular in contact with the 2nd and 3rd upper labials; ocular very small; snout with sharp horizontal edge; diameter is included in the length from 70 to 83 times.

If one regards the preocular as the ocular scale, the most natural thing to do as the eye is beneath the nasal, and the real ocular is scarcely enlarged, then the above series agree with the description of *kleobergi* in every detail except that the diameter of the type was included 56 times in the total length.

Boulenger (1915, p. 615) referred *kleobergi* to the synonymy of *lumbriciformis*. Barbour & Loveridge (1928, p. 104) revived it on account of the very obvious differences between the description of *kleobergi* and that given for *lumbriciformis* by Boulenger (1893, p. 55). The original description of Peters is too vague to be of much help.

On comparing the above series with Boulenger's redescription (1893, p. 55) which was based on a single snake from Zanzibar, and using his nomenclature for the scales, I find that ours differs in the preocular being in contact with the 2nd and 3rd labials only, not 2nd, 3rd and 4th; ocular *not* in contact with nasal; and I should be inclined to add *not* separated from the 4th labial by a subocular but in contact with the 4th labial; this, however, depends on which of two shields is considered the homologue of the ocular.

It would appear that Boulenger's description is inaccurate in some respects, and his naming of certain scales, though correct, misleading and likely to result in the description of synonyms.

Coloration in life. Flesh pink.

Measurements. Largest snake (M.C.Z. 40070) measures 500 (493 + 7) mm. Diameter at midbody 6 mm.

Breeding. Four eggs measuring 16 x 5 mm. in ♀ taken 29 June, 1934.

Diet. Termites in one of the Malindi snakes.

Habitat. The first specimen listed is one of three collected by Mr. H. J. Allen Turner in the Sokoki Forest near Malindi. I found the Mkonumbi snake lying dead upon the road five miles south of the village. It had probably been drowned out of its burrow by the torrential rains that had fallen that morning. The Gongoni reptile was in sandy soil in a native garden devoted to maize and mahoga. The Malindi series in the reddish soil of a cotton plantation. All were secured after heavy rain.

LEPTOTYPHLOPIDAE

LEPTOTYPHLOPS BOULENGERI (Boettger)

Glauconia boulengeri Boettger, 1913, in Voeltzkow, Reise in Ostafrika, **3**, p. 354, pl. xxv, fig. 1: Manda Island, Kenya Colony.

4 (M. C. Z. 40084-7) Lamu, Lamu Island, K. C. 7.v.34.

1 (M. C. Z. 40088) Kitau, Manda Island, K. C. 18.v.34.

Variation. This topotype and the series from the neighbouring island of Lamu are, I believe, the first examples of this rare snake to be taken since it was described over twenty years ago. The original description, being based on a single specimen, may be expanded as follows. Midbody scale-rows 14; diameter is included in the length 33 to 35 times (30 in type); tail is included in the total length 11 to 12 times (11 in type); supraocular scarcely once and a half times as long as broad; rostral about equal in width to (slightly wider than) the nasal, reaches backwards to an imaginary line connecting the anterior borders of the eyes; upper portion of the nasal almost in contact with its fellow behind the rostral.

Coloration in life. Flesh pink.

Measurements. The largest snake (M.C.Z. 40085) measures 201 (185 + 16) mm. Diameter at midbody 6 mm.

Diet. Termites in largest specimen.

Habitat. I caught the Kitau reptile among termites beneath a sheaf of rotting grass lying on red soil at the edge of one of the native gardens. Persistent search failed to reveal another example and it is possible that the type came from Manda, an abandoned settlement at the other end of the little island.

The species was almost certainly introduced to Lamu Island with dhow cargoes of the red soil, which in Arab times was extensively taken over to Lamu for building purposes, possibly imported with sand. It may seem strange that sand should be imported to Lamu

which is nothing but a sandbar. Nevertheless even during our brief stay a dhow came over and loaded up with sand; from the owner I learned that the coarse sand from Manda Island made better cement than the fine kind found on Lamu.

LEPTOTYPHLOPS LONGICAUDA (Peters)

Stenostoma longicauda Peters, 1854, Monatsb. Akad. Wiss. Berlin, p. 621: Tete, Mozambique.

1 (M. C. Z. 40089) Peccatoni, K. C. 24.iv.34.

33 (M. C. Z. 40090-119) Ngatana, K. C. 14-21.vi.34.

Distribution. These specimens constitute the first record of the occurrence of this species in Kenya Colony and come from an area almost exactly half-way between the most northerly record for *longicauda*, that of Tanga, Tanganyika Territory (Angel, 1925, p. 30) and the type locality of the related *fiechteri* in Italian Somaliland.

Variation. It is often difficult to measure these small snakes twice with equal precision, a trifling fluctuation in the diameter, a slight stretching of the body may result in very different proportionate readings. Especial care has been taken therefore and the extremes checked and rechecked. The following figures are based on the Ngatana series only so as to give an idea of the range of variation in one locality.

Total lengths range from 61-108.5 mm., midbody diameters 1-2 mm., diameter is included in the length 46 to 81 times, average 59.5; tails included in the total length 9.5 to 12.5 times, average 10.4. The long-tailed specimens are males, the short-tailed are females.

These specimens have been compared with Mozambique material which I collected at Lumbo. No examples of *fiechteri* have been seen for it is known only from the type which had a diameter into length of 68.5, and a tail into length of 12.5 times, which is precisely that of our Peccatoni snake.

Coloration in life. Flesh pink and somewhat transparent.

Measurements. The largest snake (M.C.Z. 40092) measures 108.5 (98 + 10.5) mm., the smallest (M.C.Z. 40019) measures 61 (55 + 6) mm.

Habitat. Ten of the Ngatana series were taken from a huge termite hill at the edge of a rice swamp and less than a quarter of a mile from the north bank of the Tana River. The rest were taken within six inches of the surface of black cotton soil forming part of the banks surrounding, and running through, flooded rice fields. In some

instances these banks were heaped with weeds, in others old maize stalks had been thrown upon them and formed some protection from the powerful sun. It appears probable, that, on the flooding of the rice fields these tiny snakes are driven to seek safety in the raised banks, resulting in a concentration of them until the water subsides. I might add that these rice fields are on the site of the old village of Ngatana, a mile or so west and north from the new village of Wema.

LEPTOTYPHLOPS CONJUNCTA (Jan)

Stenostoma conjuncta Jan. 1861, Arch. Zoöl. Anat. Fisiol., 1, p. 189: South Africa.

2 (M. C. Z. 40082-3) Kibwezi, K. C. 24.iii.34.

Corrigenda. Sternfeld's (1910, p. 13) record of *Glauconia signata* from Kibwezi is undoubtedly referable to this species.

Variation. Midbody scale-rows 14; diameter is included in the length 53 to 56 times; tail is included in the total length 10 times. It is interesting to note that when measured immediately after death the result was 51 (instead of 56) times for the larger snake.

Measurements. The larger snake (M.C.Z. 40082) measures 127 (115 + 12) mm. Diameter at midbody 2.25 mm. (in life 2.5 mm.).

Habitat. Taken in camp on freshly-cleared ground beneath a fig tree, and within two hundred yards of the station, the morning after a shower during the night.

BOIDAE

PYTHON SEBAE (Gmelin)

Coluber sebae Gmelin, 1788, Syst. Nat., 1, p. 1118: No type locality.

1 (M. C. Z. 40301) Mkonumbi, K. C. 28.v.34.

1 (M. C. Z. 40302) Ngatana, K. C. 14.vi.34.

Distribution. No attempt was made to secure a series of this well-known reptile. On the western slopes of Mount Debasien a broad trail was found in close proximity to an abandoned Karamoja village and traced through the bush for a hundred yards. (20. xi. 33). At Tsavo a seven-foot python was seen basking under a rock on a kopje not far from the river. When I stalked it, the snake withdrew into a crevice and disappeared. At Voi I was shown a large skin of a locally-killed python. It is said to occur in a swamp on a remote part of Lamu Island. I examined specimens from the Sokoki Forest (Turner coll.)

and Naivasha (L. S. B. Leakey coll.). Sternfeld has recorded an example from Kibwezi.

Native names. *Emorotot* (Karamojong); *nzatu* (Lugishu); *ivaga* (Luragoli); *ivaka* (Lutereki); *are* (Kitaita); *satu* (Kipokomo and Kiswahili).

Variation. Midbody scale-rows 88-90; ventrals 275-282; anal entire; subcaudals 68-73.

Diet. There were the remains of a bird in the young python from Ngatana.

ERYX COLUBRINUS LOVERIDGEI Stull

Eryx thebaicus loveridgei Stull, 1932, Occ. Papers Boston Soc. Nat. Hist., 8, p. 29, pl. ii, fig. B; Mbunyi, Kenya Colony.

14 (M. C. Z. 40303-16) Voi, K. C. 9-24.iv.34.

Native name. *Ngwao* (Kisagalla).

Affinities. Recently, Flower (1933, pp. 804-5) has given cogent reasons for placing *thebaicus* in the synonymy of *colubrinus* (Linné) which he has removed from the synonymy of *Eryx jaculus* (Linné) where it had been placed by Boulenger (1893, p. 125).

Overlooking Flower's paper, Ahl (1933, p. 325) referred *loveridgei* to the synonymy of *thebaicus* (i.e. *colubrinus*). In this action I was inclined to agree, but on going into the status of the East African form more fully, concluded that it may be recognized on the average lower number of ventrals as set forth in the key below under *E. c. rufescens* Ahl.

Variation. In 1932, Dr. O. G. Stull separated East African specimens under the name of *loveridgei*, distinguishing them from their northern allies on the following grounds. "This subspecies differs from the allied *E. t. thebaicus* (Reuss) of North Africa in the higher number of scale rows (53-59 instead of 47-49), the lower average number of ventrals (168-182, average 173.2) instead of 175-192 (average 184.8), and the immaculate belly and sides."

Some years ago, (1916, p. 82) I published scale counts of five East African specimens taken from Kismayu, Italian Somaliland to Taveta, Kenya Colony. More recently, when passing through Nairobi, I took the opportunity of rechecking these counts which are as follows:—Midbody scale-rows 46-53; ventrals 162-182; subcaudals 21-27.

The fourteen examples from Voi, listed above, give:—Midbody scale-rows 46-56; ventrals 162-182; anal single; subcaudals 20-27.

The latter are normally single though rarely as many as 5 (M.C.Z. 40316) may be paired.

If one collates the data of the 24 East African boas now available we have:— Midbody scale-rows 46–59, average 49; ventrals 162–182, average 170; subcaudals 20–27, average 24.

This effectually disposes of the suggestion that there is a difference in the number of midbody scale-rows between North and East African examples, neither is there any difference in subcaudal range, nor in color pattern, which is discussed below. Dr. Stull informs me that there are differences in the mandibular and pterygoid teeth as well as in the hemipenes of the two forms, this evidence will be published in her forthcoming Monograph of the Boidae.

Coloration in life. The Voi snakes were rich orange heavily mottled with black or chocolate brown. Thus they present a totally different appearance from the colored plate of an Egyptian *colubrinus* furnished by Anderson (1898, pl. xxxii, fig. 2) who describes their general color as "yellowish, with large, irregular, more or less transverse, purplish-brown markings," Major Flower writes me that he has no notes on the coloration in life of Egyptian *colubrinus*. In the absence of such data I tentatively assume that Anderson's plate and description were based on alcoholic material. Justification for this assumption may be found in the fact that Egyptian and Kenya material are almost indistinguishable after a few years in alcohol, though the Egyptian snakes may be slightly more rufous and less chocolate brown.

As both Boulenger (1893, p. 125) and Anderson (1898, p. 237) describe '*thebaicus*' (i.e. *colubrinus*) as having "lower parts uniform white," or "Under surface yellowish, immaculate." I am at a loss why Stull should have cited the "immaculate belly and sides" of East African specimens as a distinguishing character.

Measurements. The largest snake, a female (M.C.Z. 40303) measures 634 (584 + 47) mm., and is therefore the record for the southern form, the smallest (M.C.Z. 40311) measures 176 (160 + 16) mm.

Breeding. On April 24, 1934, a native brought in a female and her seven young which he had found altogether in a hole. The length of the mother is given above, the young ranged from 176 to 189 mm.

Diet. A gerbil (*Dipodillus pusillus*) was recovered from one snake. Another boa, taken on April 9, towards the close of a prolonged drought, had nothing in its stomach, but was well nourished and exhibited large deposits of fat. Such was also the condition of two females taken on the 12th.

Defence. The cloacal glands contain a very evil-smelling secretion,

those of the mother of the seven young were full and, on being pressed, shot out fine threads of the viscid fluid to a distance of one foot away.

Habitat. I captured the two adult females on the 12th beneath the debris of a collapsed native hut about a mile southeast of Voi Station. Associating with them in this situation were two female burrowing vipers (*Atractaspis microlepidotus*).

ERYX COLUBRINUS RUFESCENS Ahl

Eryx rufescens Ahl, 1933, Sitz. Ges. naturf. Freunde Berlin, p. 324, figs.: Dadab,¹ South Ethiopia.

1 (M. C. Z. 39110) Bulbar, British Somaliland (Brockman).

Affinities. Ahl recently described as a full species, a color form of *colubrinus*, which has long been confused with *thebaicus* (now a synonym of *colubrinus*). While it is not usual to recognize color races among the ophidia, our knowledge of the herpetofauna of the northeast corner of Africa leads one to suspect that it may be recognizable even though none of the scale characters cited by its author differentiate it from the typical form.

As might be expected, the specimen from British Somaliland listed above, agrees with Ahl's Ethiopian holotype in the uniform nature of its dorsal pigmentation. At mathematical midbody, however, it possesses 50 (instead of 44-46) midbody scale-rows; it has 17 (instead of 14) infralabials, an extremely variable character in this genus. I fail to see any difference such as 'somewhat broader head' or 'larger scales on the underside of the head' between this Somaliland snake and a topotypic *colubrinus* from Luxor, Egypt.

The following tentative key may aid in distinguishing the forms until more material is available.

Dorsal coloring uniform; ventrals 181-194, average (2 ex.) 187.

E. c. rufescens

Dorsal coloring consisting of heavy blotches.

Ventrals 175-197, average (36 ex.) 186.3. . . . *E. c. colubrinus*

Ventrals 162-182, average (24 ex.) 170.8. . *E. c. loveridgei*

It might be added that the uniting of ventral and subcaudal counts for these two last forms, merely reflect the same variation of 16 as is shown in the ventral counts in the key. I am indebted to Dr. O. G. Stull for furnishing me with the ventral counts, based on literature and her own researches, for *E. c. colubrinus*.

¹? Dudub, roughly 7° N., 43° E.

COLUBRIDAE

NATRIX OLIVACEA OLIVACEA (Peters)

Coronella olivacea Peters, 1854, Monatsb. Akad. Wiss. Berlin, p. 622: Tete, Mozambique.

- 6 (M. C. Z. 40316-20) Kaimosi, K. C. 11-20.ii.34.
- 1 (M. C. Z. 40321) Mkonumbi, K. C. 22.v.34.
- 1 (M. C. Z. 40322) Near Witu, K. C. 31.v.34.
- 2 (M. C. Z. 40324-5) Belazoni, K. C. 5.vi.34.
- 1 (M. C. Z. 40326) Laini, K. C. 6.vi.34.
- 18 (M. C. Z. 40327-44) Ngatana, K. C. 11-20.vi.34.
- 7 (M. C. Z. 40345-50) Golbanti, K. C. 22.vi.34.

Distribution. Already recorded from Ngatana by Günther (1894), p. 87) under the name of *Coronella olivacea* var. *dumerilii* Günther, a race described from the Gold Coast.

Native names. *Kigoyogoyo* (Luragoli); *shigoyogoyo* (Lutereki); *tine* (Kipokomo). Some Wapokomo, however, apply *tine* also to *Crotaphopeltis h. hotamboeia* which, next to *olivacea* is the most abundant snake along the lower Tana River. They have a specific name for *hotamboeia*.

Variation. Midbody scale-rows 18-19, the three snakes with 18 have 19 a short distance anterior to midbody; ventrals 131-147; anal divided; subcaudals 44-61; labials 8 (rarely 7 or 9), the 4th and 5th entering the orbit, M. C. Z. 40319 has 7 with 4th and 5th entering the orbit, M. C. Z. 40322 has 8 with 3rd, 4th and 5th, M. C. Z. 40331 has 9 with 4th, 5th and 6th, M. C. Z. 40325 has 9 with 5th and 6th, all these aberrations, however, occur on the right side only; preoculars 1, except for M. C. Z. 40333 which has 2; postoculars 3 in twenty-nine snakes, 2 in five, 1 on left side only of M. C. Z. 40336; temporals 1 + 2 excepting in four snakes where, by vertical division of the anterior temporal, we find 1 + 1 + 2, at least on one side of the head.

Though so short, the Kaimosi series displays a noticeably higher ventral count (132-147) and a lower subcaudal (44-61) as contrasted with the larger coastal series which possess 131-138 ventrals, and 52-69 subcaudals. However, a check-up with all the available data of West African *olivacea*, to which one might expect the Kaimosi snakes to belong, shows the range to be substantially the same as in the East.

Coloration. The Kaimosi series alone exhibit gray, olive and mauve types of coloring. All, however, possess the dark olive band or dorsal

stripe characteristic of snakes from the Central African Lake Region. This stripe does occur, though rarely, in the coastal series.

Measurements. The largest ♂ (M. C. Z. 40329) measures 464 (332 + 132) mm., females in the Kaimosi series easily surpass those from the coast, the largest (M. C. Z. 40318) measuring 491 (400 + 91) mm.

Breeding. The two largest females taken at Kaimosi on February 14 and 19 respectively, each held 6 well-developed eggs which measured approximately 23 x 7 mm. At Ngatana between June 11 and 20 the following were found: (1) 6 small eggs, (2) 6 eggs measuring 15 x 6 mm., (3) 6 eggs 19 x 7 mm., (4) 6 eggs 19 x 11 mm., (5) 6 eggs 22 x 10 mm., (6) 6 eggs 23 x 11 mm. These latter quite ready for deposition.

Compare these with the smaller number (2 to 4) produced by the montane race *N. o. uluguruensis* from Tanganyika Territory.

Diet. *Bufo steindachnerii* was recovered on three occasions from snakes taken at Laini and Ngatana; *Arthrolepis minutus* from a Kaimosi specimen; *Hyperolius milnei* at Golbanti; *Rana* sp. at Witu, and a fish from another Ngatana reptile.

Habitat. One beneath a board by the millpond at Kaimosi, another in a tussock of grass in midstream. One was observed to swim the Tana River in full flood at a point just above Golbanti where the river was at least fifty yards broad. On reaching the north bank it paused to rest, thus enabling me to catch it.

To do so, I placed one foot on the muddy bank, the other remaining on the side of the dugout in which we had given chase. The Pokomo boatmen, however, on observing me seize the snake, divined my intention of returning to the canoe with it, incontinently dropped their paddles and scrambled back along their unsteady craft. Without their paddles counteracting the current, the dugout was swirled away from shore. For a fleeting moment my legs spreadeagled, then I was plunged into the muddy torrent without touching bottom. As I went down I tossed the snake into the dugout where it disappeared beneath the baggage. Later it was recovered when we were unloading the craft at Golbanti.

Both at Golbanti and in the vicinity of Wema, Ngatana, the Olive Water Snake was exceedingly common among the drying grass and weeds heaped in lines to demarcate the natives' gardens.

BOAEDON LINEATUS Duméril & Bibron

(Plate 3, fig. 1)

Boaedon Lineatum Duméril & Bibron, 1854, Erpet. Gen., 7, p. 363: Gold Coast.

- 20 (M. C. Z. 40351-70) Sipi, U. 14-22.xii.33.
 5 (M. C. Z. 40371-5) Butandiga, U. 5-11.i.34.
 33 (M. C. Z. 40376-407) Kaimosi, K. C. 7-28.ii.34.
 3 (M. C. Z. 40408-10) Voi, K. C. 9.iv.34.
 1 (M. C. Z. 40411) Mt. Mbololo, K. C. 17.iv.34.
 32 (M. C. Z. 40412-43) Lamu Id., K. C. 7-14.v.34.
 1 (M. C. Z. 40444) Mkonumbi, K. C. 23.v.34.
 2 (M. C. Z. 40445-6) Peccatoni, K. C. 26.v.34.
 3 (M. C. Z. 40447-9) Near Witu, K. C. 31.v.34.
 2 (M. C. Z. 40450-1) Laini, K. C. 6.vi.34.
 13 (M. C. Z. 40452-64) Ngatana, K. C. 9-21.vi.34.
 1 (M. C. Z. 40618) Golbanti, K. C. 28.vi.34.
 2 (M. C. Z. 40465-6) Malindi, K. C. 30.vi.34.

Distribution. Also 4 from Sokoki Forest. (H. J. A. T.)

Native names. *Namage* (Lugishu); *moya* (Kisagalla); *ilumangiu* (Kitaita); *nyoka kitangu* (Kiamu); *muatu* (Kipokomo).

Variation. Midbody scale-rows 25-33; ventrals 186-238; anal single; subcaudals 46-71; labials 8, the 4th and 5th entering the orbit on both sides of the head in 102 snakes, 8 labials with the 3rd, 4th and 5th on both sides in three snakes, 9 labials with the 4th and 5th on both sides in nine snakes, 9 labials with 5th and 6th on both sides in two snakes, 9 with 4th, 5th and 6th on the right side while the left is normal in two snakes, azygous combinations of the above variations in six others; preoculars 2 except M. C. Z. 40618 which has only 1 on the right side and sixteen snakes which have only 1 on both sides, seven of the latter are from Ngatana, five from Kaimosi; postoculars 2 except for M. C. Z. 40456 which has 3; temporals 1 + 2 in 103 snakes, 1 + 3 in five, an azygous combination of these in nine others and 2 + 3 on the right side of M. C. Z. 40397.

On analysis of the above data we find the material falls into two very distinct groups, viz.:

62 snakes from the interior plateau (2,000 to 7,000 feet) which have from 29-34 midbody scale-rows and 201-238 ventrals.

56 snakes from the coastal plain (under 500 feet) which have from 25-27 midbody scale-rows and 186-213 ventrals.

The former of these corresponds to *lineatus* Duméril & Bibron, for the latter at least two names are available. For the present it seems inadvisable to recognize the latter for my records of several hundred scale-counts from South and West Africa show that the ranges are not too well defined. In brief it may be said that the nominate form inhabits West and central Africa while the counts for Angola, South Africa and the East African coast are distinctly lower, individuals with

higher counts occur in this area, however, and conversely those with low counts in the general region allocated to typical *lineatus*.

Measurements. The largest ♂ (M. C. Z. 40363) measures 820 (680 + 140) mm., the largest ♀ (M. C. Z. 40381) measures 944 (837 + 107) mm. The smallest snake (M. C. Z. 40435) measures 122 (85 + 37) mm.

I was very much struck by the smaller size of all, except two large females, in the Lamu series (see remarks on diet below). The average total length of thirteen males was 480 mm. as against an average total length of thirteen unselected males from the more tropical central region (Sipi, Butandiga, Kaimosi) of 657 mm.

The largest ♂ in the Lamu series measured 554 mm., the largest ♀, 918 mm. It will be seen that the latter is not far short of the biggest ♀ from Kaimosi, but together with one other ♀ it was far larger than the average for the island.

Breeding. The undermentioned records of developing eggs were made.

| | |
|------------------------------|--|
| Sipi, December 16, 1933. | ♀ held 1 egg measuring 37 x 18 mm. |
| Butandiga, January 11, 1934. | ♀ held 1 egg measuring 28 x 13 mm. |
| Kaimosi, March 1, 1934. | ♀ held 7 eggs measuring 29 x 15 mm. |
| Kaimosi, March 1, 1934. | ♀ held 10 eggs "ready for deposition." |
| Lamu Id., May 10, 1934. | ♀ held 5 eggs measuring 28 x 12 mm. |

The first two are difficult of explanation for the snakes were large examples, the Butandiga reptile held a second egg only half the size of the one measured. The Kaimosi snake with seven eggs actually measured 38 inches.

Diet. Rodent fur was present in three snakes from Sipi and one from Malindi. The shrew (*Crocidura t. zaodon*) was recovered from a Sipi and a Butandiga snake; a roof rat (*Rattus r. kijabius*) measuring 7½ inches from snout to anus was in the stomach of a 38" female House Snake at Kaimosi (see plate 3, fig. 1), a smaller rat in a second snake; a family of pigmy mice (*Leggada t. triton*) in one Sipi snake, a single one in another reptile from Kaimosi; at this locality two snakes had swallowed mice (*Leggada g. grata*.)

A young House Snake was taken in the act of swallowing a gecko (*Hemidactylus mabouia*) at Ngatana; another species of gecko (*Lygodactylus p. mombasicus*) had been swallowed by one at Voi; a lizard (*Eremias neumanni*) was recovered from another Ngatana snake; a skink (*Siaphos kilimensis*) from an Mbololo reptile.

¹Misprinted in mammal report as 32".

On Lamu Island, for the first time in my experience of this reptile, amphibian bones were found in one, a frog (*Rana o. oxyrhynchus*) in another, the burrowing frog (*Hemisus m. marmoratum*) in a third. It might be added that mammals are very scarce on the island, this factor may have forced the snakes to an amphibian diet; possibly we have here the explanation of the small size attained by *Boaedon lineatus* on Lamu (see above) though this is probably correlated with the reduced number of midbody and ventral scale counts.

Parasites. Two Sipi snakes had the larval stages of Protocephalid tapeworms encysted on their mesenteries, their viscera being all snarled up with adhesions resulting from the encysted worms. A Kaimosi snake was similarly affected.

Enemies. One House Snake was found in the stomach of a Banded Harrier-Eagle (*Circaetus fasciolatus*) at Ngatana.

Aestivation? On February 10, 1934, at Kaimosi, a native brought in four House Snakes, all of the same size and nearly full-grown. He stated that while engaged in digging a pit, he had come upon them all together in a hole. As the rains had not broken as yet, it would appear that they were aestivating in company.

Folklore. On Mount Mbololo several Wataita told me that the House Snakes which I had collected, were the mountain form of the Mamba (*Dendraspis angusticeps*) which was found lower down! Whether this idea is widespread, or the invention of my informant, I cannot say.

BOAEDON OLIVACEUS (Duméril)

Holurophis olivaceus A. Duméril, 1856, Rev. Mag. Zoöl., p. 466: Gaboon.

♂ (M. C. Z. 39965) Mabira Forest, U. 28.viii.33.

Distribution. This snake was collected and presented by Captain C. R. S. Pitman. The species has been recorded from Uganda previously.

Variation. Midbody scale-rows 25; ventrals 192; anal entire; subcaudals 52; labials 8, the 4th and 5th entering the orbit; temporals 1 + 2.

Boulenger (1893, p. 335) with only Cameroon material, states: "frontal once and a half as long as broad, as long as its distance from the end of the snout." In a series from Metet, Cameroon (M. C. Z. 10307-13) the frontal is $1\frac{1}{4}$ to $1\frac{1}{8}$ as long as broad. In the Uganda snake, which otherwise conforms to Boulenger's description except in

coloration, the frontal is scarcely longer than broad and only as long as the prefrontals and internasals together, *i.e.* shorter than its distance from the end of the snout.

Coloration in alcohol. Above, uniformly plumbeous. Below, yellow, the dorso-lateral pigmentation strongly impinging upon the ventrals which also are spotted or blotched with plumbeous sparsely and irregularly.

Measurements. This ♂ measures 594 (495 + 99) mm.

Habitat. Captain Pitman expressed surprise on hearing that this reptile was a relative of the Brown House Snake for in habits he believes it to be a waterside or semi-aquatic snake.

LYCOPHIDION CAPENSE CAPENSE (Smith)

(Plate 3, fig. 2)

Lycodon capense A. Smith, 1831, S. Africa Quart. Journ., (1) No. 5, p. 18: Kurrichane, *i.e.* Rustenberg district, Transvaal.

1 (M. C. Z. 39966) Kigezi district, U. C.R.S.Pitman.

1 (M. C. Z. 40467) Sabei, Mt. Elgon, U. 9.xii.33.

3 (M. C. Z. 40468-70) Sipi, Mt. Elgon, U. 10-27.xii.33.

4 (M. C. Z. 40471-3) Kaimosi, K. C. 25.ii-2.iii.34.

1 (M. C. Z. 40474) Mkonumbi, K. C. 28.v.34.

3 (M. C. Z. 40475-7) Ngatana, K. C. 18.vi.34.

Native name. *Wahobi* (Lugishu); *Kifuya* (Kipokomo).

Variation. Midbody scale-rows 17; ventrals 180-214; anal entire; subcaudals 29-54; upper labials 8, the 3rd, 4th and 5th entering the orbit; distance from the frontal to the end of the snout shorter, or much shorter, than the length of the parietals.

Coloration. Agreeing with the typical form in the throat being more or less white. In the field the Uganda and Kaimosi (*i.e.* western Kenya) snakes were noticeably more spotted than the coastal specimens. This difference is not correlated with any scale characters enabling one to separate them.

Measurements. The largest ♂ (M. C. Z. 40469) measures 443 (377 + 66) mm., the largest ♀ (M. C. Z. 40468) measures 558 (495 + 63) mm. though one from Sabei with an injured tail surpasses the snout to anus length by 10 mm.

Breeding. The big Sabei female held six eggs measuring 17 x 12 mm. on December 9, 1933. In marked contrast was the smallest Kaimosi

reptile, measuring 267 mm. which held but a single egg measuring 20 x 6 mm. on March 2, 1934.

Diet. A Striped Skink (*Mabuya striata*) was recovered from a Sipi snake and an *Ablepharus wahlbergii* from another at Kaimosi.

LYCOPHIDION CAPENSE > < ACUTIROSTRE Günther

Lycophidion intermediates between *capense* and *acutirostre* Loveridge, 1933, Bull. Mus. Comp. Zool., **74**, p. 234: Zanzibar and Bagamoyo, Morogoro and Kilosa in Tanganyika Territory.

2 (M. C. Z. 40478-9) Kibwezi, K. C. 23.iii.34.

1 (M. C. Z. 40480) Mt. Mbololo, K. C. 26.iv.34.

1 (M. C. Z. 40481) Malindi, K. C. 30.vi.34.

1 (Destroyed) Changamwe, K. C. 5.vii.34.

Distribution. Also 4 from Sokoki Forest (H. J. A. T.). These records extend the area of intermediates to the northward as was to be expected. It seems probable that eventually it will be advisable to increase the range of ventrals in *acutirostre* so as to include them with that form. For further discussion see citation given above. What is needed is a large series of Zanzibar material so that the ventral range on that island may be ascertained.

Variation. Midbody scale-rows 17; ventrals 154-170; anal entire; subcaudals 28-37; upper labials 8, the 3rd, 4th and 5th entering the orbit; parietal length slightly or much longer than the distance from the frontal to the end of the snout.

Coloration. All the above agree in having the throat and lower surface uniformly blackish or blackish-brown.

Measurements. The largest ♂ (M. C. Z. 40478) measures 294 (260 + 34) mm., the largest ♀ (M. C. Z. 40481) measures 399 (350 + 49) mm.

Breeding. The largest female held eight eggs measuring 13 x 7 mm. on June 30, 1934.

Diet. A lizard (*Eremias s. spekii*) and a skink (*Riopa sundevallii*) were recovered from the two Kibwezi snakes.

Parasites. A single nematode (*Ophidascaris sp.*) was preserved from the stomach of the Malindi female.

Enemies. A male was disgorged by another snake (*Calamelaps unicolor*) taken at Changamwe. The wolf snake was only 20 mm. shorter than its captor. It was so far decomposed that, after taking its scale counts, I destroyed it. Its first three subcaudals were unpaired.

MEHELYA NYASSAE (Günther)

Simocephalus nyassae Günther, 1888, Ann. Mag. Nat. Hist., (6), 1, p. 328:
Lake Nyasa, Nyasaland.

♀ (M. C. Z. 40482) Wema, Ngatana, K. C. 13.vi.34.

Distribution. Besides the type, in 1893, the British Museum only possessed a second specimen from Zanzibar. In 1918 I collected a female at Lumbo, Mozambique. The above specimen from the north bank of the Tana River constitutes a northward extension of its range by some 250 miles and is the first record for Kenya.

Variation. Midbody scale-rows 15; ventrals 175; anal entire; subcaudals 55 (as against 62-63); labials 7, the 3rd and 4th entering the orbit; preocular 1; postocular 1; temporals 1 + 2. It differs from the description in the Catalogue of Snakes (1893, p. 347, pl. xxiii, Fig. 2) in the internasals being two-thirds, not half, the length of the prefrontals; the frontal as long as, not longer than, broad, and *shorter* than its distance from the rostral.

Measurements. This gravid ♀ measures 554 (452 + 102) mm.

Breeding. The oviducts held three eggs measuring 10 x 4 mm. on June 13.

Defence. On being struck with a stick by one of a gang employed in clearing grass immediately in front of my tent, this Nyasa File Snake emitted a most foul odour, far surpassing that of the European Grass-snake.

CHLOROPHIS CARINATUS Anderson

Chlorophis carinatus Andersson, 1901, Svenska Vetensk.- Akad. Handl., 27,
No. 5, p. 9: Cameroon.

♂ (M. C. Z. 40173) Sipi, U. 18.xii.33.

♂ (M. C. Z. 40483) Kaimosi, K. C. ii.34.

Distribution. Originally described from the Cameroon, subsequently recorded by Schmidt (1923, p. 74) from the Belgian Congo, the two specimens listed above constitute the first records for the occurrence of *carinatus* in Uganda and Kenya Colony.

Native name. *Kangasira* (Lugishu). The Bagishu recognize the distinctiveness of this species from *C. hoplogaster* which occurs alongside it both at Sipi and Kaimosi, but which is far more abundant.

Affinities. Naturally I have considered the possibility of these being

aberrant examples of either *hoplogaster* or *irregularis*. The combination, however, of 13 midbody scale-rows and an undivided anal appear to preclude this possibility even should we negate the distinctive coloring of *carinatus*. Elsewhere I have discussed the relationships of *carinatus* with *heterodermus* which so frequently occurs with it.

If the ventral and subcaudal ranges as given by Hecht (1929, p. 331) are correct then there is nothing to differentiate the western *carinatus* from the eastern *macrops* (confined to the Usambara Mountains) except the number of labials and their arrangement—normally 9, with the 4th, 5th and 6th entering the orbit in *carinatus*, normally 8 with the 5th and 6th entering in *macrops*. From their coloration also it is undoubtedly true that *carinatus* is the western representative of *macrops* but it appears inadvisable to treat it as a race in view of the fact that their ranges are still separated by some 450 miles.

Variation. Midbody scale-rows 13; ventrals 146–152, faintly keeled on anterior third of body; anal entire; subcaudals 82–86; labials 9, the 4th, 5th and 6th entering the orbit, or 10, the 4th, 5th, 6th and 7th entering on the left side only (M. C. Z. 40175); preocular 1; postoculars 2; loreal 1; temporals 2 + 2 or 2 + 1.

Measurements. The larger ♂ (M. C. Z. 40173) measures 238 (152 + 86) mm.

Coloration in life. On receiving the somewhat damaged Sipi snake, I immediately recognized its distinctive appearance as compared with *hoplogaster* which was so common in this locality. Fortunately I recorded its coloring at once, for in alcohol it is indistinguishable from that of *hoplogaster*. This coloration should be compared with that of *macrops* which I noted in the Usambaras (Barbour & Loveridge, 1928, p. 116).

Above, dark olive with 104 deep-black, irregular crossbands between head and anus, these are represented on the tail by black flecks; the olive scales between the crossbands are edged with pale blue on the anterior two-thirds of the body; upper lip brownish-olive anteriorly, white below the eye shading off into olive posteriorly. Below, throat pure white, anterior ventrals tinged with yellow, remainder of the under surface dark green with its anterior third heavily suffused with yellow; on the anterior two-thirds edged with yellow laterally, on the posterior third with bluish white, on the tail with dusky.

Eye. The centre of the eye is black surrounded by a light area, then by a fine orange line, then by an olivaceous area flecked with black; outermost ring, black.

CHLOROPHIS HOPLOGASTER (Günther)

Ahaetulla hoplogaster Günther, 1863, Ann. Mag. Nat. Hist. (3), 11, p. 284:
Port Natal, i.e. Durban, Natal.

- 1 (M. C. Z. 40496) Mt. Debasien, U. 15.xi.33.
- 22 (M. C. Z. 40151-72) Sipi, Mt. Elgon, U. 12-23.xii.33.
- 12 (M. C. Z. 40484-95) Butandiga, U. 5-16.i.34.
- 1 (M. C. Z. 40497) Kirui's Village, K. C. 25.i.34.
- 13 (M. C. Z. 40498-509) Kaimosi, K. C. 19.ii-5.iii.34.

Native name. *Eman* (Karamojong); *naranyase* (Lugishu), but neither specific.

Variation. Midbody scale-rows 15; ventrals 153-178; anal divided; subcaudals 87-109; labials 8, the 4th and 5th entering the orbit on eighty sides, or 9, the 4th and 5th entering on two sides, or 9, the 5th and 6th entering on sixteen sides; preoculars 1, or 2 on three sides (M. C. Z. 40501, 40504); postoculars 2, or 3 on left side of M. C. Z. 40492 only; temporals 1 + 2 on sixty-three sides, 1 + 1 on thirty-four sides, or 2 + 2 on one side of M. C. Z. 40489.

Some years ago, I (1916, p. 78) invited attention to the variations in two large collections of *Chlorophis* made by Mr. H. J. Allen Turner at his camps at Kaimosi and on the Yala River nearby. Shortly afterwards a third collection was received in which the *hoplogaster* material exhibited the following astonishing labial variations:

| | | | | | | |
|---|---|---|-----|---|---------------------------|-------|
| 1 specimen with 7-7 supralabials, 3rd and 4th entering the orbit. | | | | | | |
| 1 | " | " | 7-7 | " | 4th and 5th | " " " |
| 1 | " | " | 7-8 | " | 4th and 5th | " " " |
| 1 | " | " | 8-7 | " | 4th and 5th & 3rd and 4th | " " |
| 10 | " | " | 8-8 | " | 4th and 5th | " " " |
| 1 | " | " | 8-8 | " | 5th and 6th | " " " |

Measurements. The largest ♂ (M. C. Z. 40499) measures 930 (700 + 230) mm. but the tip of the tail is lacking; largest ♀ (M. C. Z. 40155) measures 1045 (762 + 283) mm.; the smallest snake (M. C. Z. 40166) measures 435 (305 + 130) mm.

Breeding. The undermentioned records of developing eggs were made in the field. It should be noted, however, that several females were taken at Sipi between December 12 and 23, which showed no signs of developing ova and the snake taken on the 23rd held an eighth egg much smaller than the other seven.

| | | | | | |
|---------------|--------------|-----------|-------------------------|------|---------|
| Mt. Debasien, | November 11, | 1933. | ♀ held 7 eggs measuring | 21 x | 8 mm. |
| Sipi, | December 12, | 1933. | " 7 " | 17 x | 5 mm. |
| " | " | " | " 4 " | 22 x | 6 mm. |
| " | " | " | " 5 " | 30 x | 8 mm. |
| " | " | " | " 4 " | 31 x | 13 mm. |
| " | " | 23, 1933. | " 7 " | 27 x | 8 mm. |
| Butandiga, | January 5, | 1934. | " 6 " | 13 x | 5.5 mm. |
| Kaimosi, | February 20, | 1934. | " 7 " | 30 x | 12 mm. |
| " | " 25, | 1934. | " 8 " | 31 x | 13 mm. |
| " | March 3, | 1934. | " 5 " | 34 x | 12 mm. |

Dict. A gecko (*Cnemaspis a. elgonensis*), the freshly dropped tail of a lizard (*Lacerta jacksoni*), a skink (*Mabuya striata*), a chameleon (*C. b. höhnlii*), and a frog (*Rana f. fuscigula*) were found in Sipi snakes. Three snakes held chameleons (*C. b. höhnlii*) and a fourth a toad (*Bufo r. regularis*) at Butandiga. A skink (*M. striata*) in an old *hoplogaster*, an enormous frog (*Rana o. gribinguensis*) in a quite moderately sized snake, a tree frog (*Hyperolius rossii*) in a very young one at Kaimosi.

Parasites. Encysted nematodes were found in the stomach wall of a Kaimosi reptile and preserved.

CHLOROPHIS NEGLECTUS (Peters)

Philothamnus neglectus Peters, 1866, Monatsb. Akad. Wiss. Berlin, p. 890: Prazo Boror, Mozambique.

- ♀ (M. C. Z. 40515), Nairobi, K. C. 17.iii.34.
- 2 (M. C. Z. 40516-7) Peccatoni, K. C. 24.v.34.
- 1 (M. C. Z. 40518) Mkonumbi, K. C. 29.v.34.
- ♂ (M. C. Z. 40519) Near Witu, K. C. 30.v.34.
- ♂ (M. C. Z. 40520) Kau, K. C. 4.vi.34.
- 2 (M. C. Z. 40521) Ngatana, K. C. 12.vi.34.

Distribution. On April 21, 1934 at 4,800 feet on Mount Mbololo, I captured a green snake which I believe to be this species, unfortunately it escaped. It was in a forest glade at the summit.

Native name. *Homboka* (Kipokomo).

Variation. Midbody scale-rows 15; ventrals 151-171; anals 2; sub-caudals 92-109; labials 8, the 4th and 5th entering the orbit; preocular 1; postoculars 2; temporals 1 + 1 except for the Nairobi snake which had 1 + 2.

Measurements. The largest ♂ (M. C. Z. 40519) measures 735 (500 + 235) mm., the largest ♀ (M. C. Z. 40515) measures 723 (553 + 170) mm. but the tip of its tail is missing.

Breeding. The females taken at Peccatoni on May 24, held 5 eggs measuring 17 x 5 mm. and 7 eggs measuring 18 x 9 mm. respectively. The Ngatana ♀ held 6 eggs measuring 23 x 8 mm. on June 12, 1934.

Dict. One Peccatoni snake had swallowed two juvenile frogs (*Rana edulis*).

Habitat. I captured one of the Peccatoni snakes far out among the lily pads of a swamp where it was hunting frogs, the other was associated with a couple of Spotted Wood Snakes (*Philothamnus s. semivariegatus*) in a small doom palm growing in knee-deep water in this same flood area.

CHLOROPHIS IRREGULARIS (Leach)

Coluber irregularis Leach, 1819, in Bowdich, Miss. Ashantee, p. 494: Ashanti, Gold Coast.

Ahaetulla emini Günther, 1888, Ann. Mag. Nat. Hist. (6), 1, p. 325: Monbuttu, Belgian Congo.

Chlorophis schubotzi Sternfeld, 1912, Wiss. Ergebn. Deut. Zentral-Afrika-Exped., 1907-1908, 4, p. 269, fig.: Bwanja, near Bukoba, Tanganyika Territory.

5 (M. C. Z. 40523-7) Mt. Debasien, U. 18-30.xi.33.

6 (M. C. Z. 40510-4, 40529) Kaimosi, K. C. 12.ii-1.iii.34.

Native name. *Emun* (Karamojong), but not specific.

Variation. Midbody scale-rows 15; ventrals 161-184; anal divided except in M. C. Z. 40525 in which it is single though this snake is undoubtedly correctly referred to *irregularis*; subcaudals 98-122; labials 9, the 4th, 5th and 6th entering the orbit on seventeen sides (8 snakes normal), or 8, the 3rd, 4th and 5th entering the orbit on six sides, or 7, the 3rd, 4th and 5th entering the orbit on one side; preoculars 1, or 2 in M. C. Z. 40525, in contact with, or separated from the frontal; postoculars 2, or 4 in M. C. Z. 40524; temporals 1 + 1 on nineteen sides, 1 + 2 on three sides.

Measurements. The largest ♂ (M. C. Z. 40523) measures 769 (548 + 221) mm., the largest ♀ (M. C. Z. 40514) measures 774 (547 + 227) mm.

Habitat. On Mount Debasien, I captured one snake as it was basking on the bank of a dry water course at 6,000 feet, another in vegetation on the bank of the Amaler River at 5,000 feet.

PHILOTHAMNUS SEMIVARIEGATUS SEMIVARIEGATUS Smith

Philothamnus semivariegatus A. Smith, 1849, Illus. Zoöl. S. Africa, 3, pls. lix, lx, lxiv: Bushman's Flats and Kurrichane, S. Africa.

- 1 (M. C. Z. 40528) Mount Debasien, U. 24.xi.33.
- 1 (M. C. Z. 40530) Kibwezi, K. C. 23.iii.34.
- 3 (M. C. Z. 40531-3) Mt. Mbololo, K. C. 18.iv.34.
- 3 (M. C. Z. 40534-6) Lamu, Lamu Id., K. C. 8.v.34.
- 3 (M. C. Z. 40537-9) Peccatoni, K. C. 26.v.34.
- 4 (M. C. Z. 40540-3) Ngatana, K. C. 11.vi.34.
- 2 (M. C. Z. 40544-5) Malindi, K. C. 30.vi.34.

Distribution. Also from Sokoki Forest (H. J. A. T.).

Native names. *Ekumbu* (Kitaita, but also applied to the Boomslang); *kongoani* and *ukutiwiti* (Kiamu); *hasowitu* (Kipokomo).

Variation. Midbody scale-rows 15, except for M. C. Z. 40530 which has 13 though this snake exhibits the normal number an inch in advance of midbody; ventrals 164-196; anals 2; subcaudals 130-160; labials 8-10, though 8 only on the right side of M. C. Z. 40544 which has the 5th and 6th labials fused, and 10 on the right side of M. C. Z. 40539, 5th and 6th labials entering the orbit except on the right side of M. C. Z. 40544 where it is the 5th only, and three snakes (Nos. 40533, 40538, 40545) where the 4th, 5th and 6th enter either on both sides, or left only, or right only; preoculars 1, except M. C. Z. 40542 which has 2; postoculars 2, except on the right side of M. C. Z. 40528 where there are 3; temporals 2 + 2, except M. C. Z. 40535 which has 1 + 2 and M. C. Z. 40534, 40536 which have 2 + 1, all these last three variants being from Lamu Island.

Measurements. The largest ♂ (M. C. Z. 40545) measures 1032 (650 + 382) mm., the largest ♀ (M. C. Z. 40534) measures 1233 (785 + 448) mm.

Breeding. Three eggs measuring 32 x 10 mm. were taken from a Lamu snake on May 8, 1934; three others measuring 25 x 6 mm. present in the Malindi female on June 30, 1934.

Diet. A gecko (*Lygodactylus p. gutturalis*) in the young Spotted Wood Snake from Mount Debasien, two (*L. p. nombasicus*) in the Kibwezi and one in the Mount Mbololo reptiles; two geckos (*Hemidactylus persimilis*) in a Lamu snake; two geckos (*H. mabouia*) in one from Malindi, a frog (*Rana o. oxyrhynchus*) in the other.

Enemies. One was recovered from the stomach of the rare Banded Harrier Eagle (*Circaetus fasciolatus*) at Ngatana.

Habitat. The Debasien snake was very cleverly ascending the trunk of a big fig tree; one Peccatoni snake was in a doom palm with *Chlorophis neglectus*, I caught another among water plants in waist-deep water, where it was presumably hunting frogs. Yet another was cap-

tured near Witu at 8 p.m., it was in a bramble bush within a foot of a tree frog (*Chiromantis xerampelina*) which it was apparently stalking. The bush was growing in knee-deep water and I had to reach up to seize the snake which I transferred to my handkerchief pocket, stuffing the handkerchief in on top to detain it: on reaching camp, however, I found that the snake had departed without my knowledge.

HAPSIDOPHRYS LINEATA Fischer

Hapsidophrys lineata Fischer, 1856, Abhand. Nat. Ver. Hamburg, **3**, p. 111, pl. ii, fig. 5: Elmine, West Africa, i.e. Elmina, Gold Coast.

3 (M. C. Z. 40546-8) Kaimosi, K. C. 15-19.ii.34.

Distribution. The Coryndon Museum has a specimen from Kedowa, on the Kenya-Uganda Railway, west of Kisumu.

Variation. Midbody scale-rows 15; ventrals 158-166; anal 1; subcaudals 93-98; labials 8, the 4th and 5th entering the orbit; preocular 1; postoculars 2-3; temporals 2 + 2, or 2 + 1 in M. C. Z. 40546.

Measurements. The largest of these three females (M. C. Z. 40546) measures 974 (700 + 274) mm.

Breeding. The large ♀ held four eggs measuring 16 x 5 mm. on February 19.

Diet. In her stomach was a frog (*Rana f. chapini*).

THRASOPS JACKSONII JACKSONII Günther

Thrasops Jacksonii Günther, 1895, Ann. Mag. Nat. Hist., (6), **15**, p. 528: Kavirondo, Kenya Colony.

Thrasops Rothschildi Mocquard, 1905, Bull. Mus. Paris, **11**, p. 287: "Afrique orientale anglaise."

3 (M. C. Z. 40680-2) Sipi, Mt. Elgon, U. 14-15.xii.33.

5 (M. C. Z. 40551-2, 40683-5) Butandiga, U. 8-11.i.34.

3 (M. C. Z. 40550, 40686-7) Kaimosi, K. C. 25-28.ii.34.

Native names. *Yakobe* for black adults, *isilukanga* for dark olive adults and half-grown (Lugishu).

Synonymy. The type of *jacksonii* had 19 midbody scale-rows; 198 ventrals; 138 subcaudals. The type of *rothschildi*, which may have come from either Kenya or Uganda, had 17 midbody scale-rows; 187 ventrals; 141 subcaudals. Both types were uniformly black.

Peracca (1909, p. 172) shows the extraordinary variation in head shields exhibited by a pair (♂ ♀) obtained at Toro, Uganda.

Schmidt (1923, p. 85, Fig. 6) gives by far the best account of variation in *jacksonii*, his remarks being based on eighteen snakes from the Belgian Congo. It is important to note that of these, sixteen had 19 midbody scale-rows, one had 17, one had 21; ventrals 192–211; subcaudals 135–155. His figure shows that there is in reality no difference in rostral and frontal characters between *jacksonii* and *rothschildi* or Lönnberg's snakes from Mount Kenya.

In each of the series listed above—Sipi, Butandiga and Kaimosi—there is one snake with 17 midbody scale-rows, the others having 19. This appears to show a tendency in the eastern part of the range for a reduction in the number of midbody scale-rows. One of the Kaimosi series (M. C. Z. 40550), coming as it does from a spot bordering on the type locality of *jacksonii*, has a scale count almost identical with that of the type of *rothschildi*. It has 17 midbody scale-rows; 190 ventrals; 141 subcaudals. I consider, therefore, that *rothschildi* is a synonym of *jacksonii*.

Variation. Midbody scale-rows 17–19; ventrals 188–202; anal divided; subcaudals 130–144; labials 8, the 4th and 5th entering the orbit, except on left side of M. C. Z. 40686 which has 9 with 4th and 5th entering, and M. C. Z. 40552 which has 9 with 5th and 6th entering on both sides of the head; preoculars 1, or 2 in three snakes only; postoculars 3; temporals 1 + 1.

Measurements. The largest ♂ (M. C. Z. 40681) measures 1637 (1140 + 497) mm., the largest ♀ (M. C. Z. 40683) measures 1797 (1275 + 522) mm., but is surpassed in length from snout to anus by 38 mm. in a snake with mutilated tail.

Breeding. The undermentioned records of developing eggs were taken.

| | | |
|------------|--------------------|---------------------------------------|
| Sipi, | December 14, 1933, | a ♀ held 12 eggs measuring 19 x 8 mm. |
| Butandiga, | January 8, 1934, | " 10 " " 31 x 16 mm. |
| " | " 8, 1934, | " 7 " " 35 x 8 mm. |
| " | " 11, 1934, | " 8 " " 23 x 9 mm. |

Diet. One Sipi snake had mouse fur in its stomach, the Butandiga specimens (1) a tree rat (*Cenomys b. editus*), (2) bird, (3) *Chamaeleon senegalensis*, (4) *Chamaeleon b. höhnelii*.

CORONELLA SEMIORNATA SEMIORNATA Peters

Coronella semiornata Peters, 1854, Monatsb. Akad. Wiss. Berlin, p. 622: Tete, Mozambique.

- Zamenis fischeri* Peters, 1879, Monatsb. Akad. Wiss. Berlin, p. 777: Malindi, Kenya Colony.
- Coronella inornata* Fischer, 1884, Jahr. Hamburg, Wiss. Anst. 1, p. 6, pl. i, fig. 2: Masailand, near Arusha, Tanganyika Territory.
- Coronella scheffleri* Sternfeld, 1908, Sitzber. Ges. Naturf. Freunde Berlin, p. 93; and 1908, Mitt. Zoöl. Mus. Berlin, 4, p. 243, figs. 1 and 2: Kibwezi, Kenya Colony.
- Coronella semiornata* var. *mossambicae* Cott, 1935 (1934), Proc. Zoöl. Soc. London, p. 967: Charre and Fambani, Mozambique.

♀ (M. C. Z. 40553) Kibwezi, K. C. 29.iii.34.

Synonymy. *C. scheffleri* was based on an individual which was said to differ from *semiornata* in its more projecting snout, the preocular being separated from the frontal, the rostral (originally stated to be as deep as broad) only slightly broader than deep, the more numerous subcaudals.

C. scheffleri had 91 subcaudals, the range for *semiornata* given by Boulenger (1894, p. 195) who only had three specimens, 63-88, my topotype of *scheffleri* has 88, other Kenya-Tanganyika material I have examined range from 71-91. The latter figure being reached by a snake from the Ulukenyia Hills which I referred to (1929, p. 26) as an intermediate. The character of the preocular being separated from, or in contact with, the frontal is of no significance in this species where both conditions occur in the same locality, even in the same specimen (M. C. Z. 23067). From Sternfeld's figures I am inclined to think that it is the frontal that is shortened rather than the snout which is lengthened in his type, the frontal length in *scheffleri* equals its distance from the rostral whereas normally in all our *semiornata* it is greater than its distance from the end of the snout. The topotype is normal in this respect in view of which I think that *scheffleri* may be considered a slightly abnormal individual.

In describing *mossambicae* Cott was under the assumption that his specimens resulted in a considerable extension of the range of *semiornata*. He overlooked the fact that the type came from Tete, some 125 miles from Charre. His specimens agree well with the fine colored plate xvii, fig. 2 furnished by Peters in the Reise nach Mossamb., 3, (1882), but indeed the markings on which alone he bases the race are subject to considerable variation by the intermediate bars becoming obsolescent.

Measurement. This ♀ measures 484 (366 + 118) mm.

Breeding. She held two eggs measuring 40 x 8 mm. in her oviducts.

Variation. Midbody scale-rows 21; ventrals 196; anals 2; subcaudals 88; labials 8, the 4th and 5th entering the orbit on the right, or 9, the 5th and 6th entering the orbit on the left; preoculars 2 and 1 (right and left respectively); postoculars 2; temporals 2 + 3 (right, like *scheffleri*) or 2 + 2 (left, like *semiornata*).

Kibwezi is on the edge of the red laterite country so that it is not surprising to find this snake presenting an anomalous scalation intermediate between the typical form, with which it agrees in coloring, and the recently described race *C. s. fuscrosea*.

CORONELLA SEMIORNATA FUSCOROSEA Loveridge

Coronella semiornata fuscrosea Loveridge, 1935, Bull. Mus. Comp. Zool., 79, p. 8: Mount Mbololo, Taita, Kenya Colony.

3 (M. C. Z. 40555-7) Mt. Mbololo, K. C. 25.iv.34.

1 (M. C. Z. 40554) Tsavo, K. C. 2.iv.34.

Affinities. When describing this snake, it was with some misgivings that I referred it to the genus *Coronella*. While its nearest relative actually appears to be *C. semiornata*, the question arises as to whether the tropical African snakes *semiornata*, *coronata*, etc., are really congeneric with the palearctic *austriaca*, *amaliae* and *giron dica* which represent true *Coronella*, *austriaca* being the genotype. These palearctic species have a broad, shield-shaped frontal.

The tropical African species, and Dr. Malcolm Smith informs me that the Indian species *brachyura* agrees with them in this respect, have a more elongate, concave-sided frontal, in which they agree with *Coluber florulentus* of North Africa and Northern Kenya as well as with the genotype *Coluber c. constrictor* of North America.

Boulenger (1894, p. 3) separated *Zamenis* (i.e. *Coluber* for our purposes) from *Coronella* on the following characters:

Head elongate, distinct from neck. Subocular present. . . . *Zamenis*
Head not or but slightly distinct from neck. No subocular. . *Coronella*

The head of *florulentus* is unappreciably longer and not more distinct from the neck than is that of *semiornata* or *fuscrosea*. The scale termed subocular in *constrictor* and *florulentus* by Boulenger, might equally well be called a lower preocular, Dr. E. R. Dunn suggests subpreocular for this scale which I called a lower preocular when describing *fuscrosea*.

The markings on the young Tsavo paratype (they disappear entirely in the adult) bear so strong a resemblance to those of *florulentus* that

I cannot help thinking that *fuscorosca* is derived therefrom, forming a connecting link between that species and *semiornata* and the other so-called Coronellae forming the tropical African group. The cranial characters which Boulenger (1913, p. 47) subsequently utilized in distinguishing Zamenis and Coronella also lead one to suspect that these tropical African forms have little in common with Coronella of Europe and North Africa.

I am not transferring them to Coluber at the present time for such action should be based on a thorough revisionary study of the whole genus Coluber and certain closely related genera. Precipitate action might result in ultimate confusion.

Habitat. The juvenile, taken on the banks of the Tsavo River near the station, had its head protruding from a hole at the base of a leafless, scrubby bush. It promptly withdrew into the burrow from which I dug it out. According to the natives, no rain had fallen for a year, and though only about 9 a.m. the weather was intensely hot.

CORONELLA CORONATA (Schlegel)

Calamaria coronata Schlegel, 1834, Phys. Serp., 2, p. 46: Gold Coast.

Meizodon regularis Fischer, 1856, Abhand. Nat. Ver. Hamburg, 3, p. 112, pl. iii, fig. 3: Peki, Gold Coast.

Coronella regularis praeornata Angel, 1933, "Les Serpentes de l'Afrique occidentale Francaise." Paris, p. 123: West Africa and Uganda.

1 (M. C. Z. 40323) Kau, Tana River, K. C. 4.vi.34.

1 (M. C. Z. 40559) Ngatana, Tana River, K. C. 12.vi.34.

1 (M. C. Z. 40558) Golbanti, Tana River, K. C. 22.vi.34.

Distribution. These three snakes constitute the first records of the occurrence in Kenya of *coronata* (or *regularis*) but are in keeping with other elements of a West African fauna surviving along the Tana River close to the Indian Ocean.

Affinities. Boulenger (1894, p. 190) was illogical in keeping *regularis* distinct from *coronata*. He separated them as follows:

Four lower labials in contact with an anterior chin-shield; belly yellow
coronata

Five lower labials in contact with an anterior chin-shield; belly blackish
regularis

yet of its East African ally, *C. semiornata*, he writes (p. 195):

"four or five lower labials in contact with the anterior chin-shields
ventrals yellowish, uniform or edged with black."

As previously stated (1929, p. 27), I agreed with Schmidt (1923, p. 87) that *regularis* should probably be united with *coronata*. The additional evidence furnished by the Tana River snakes makes this necessary for they continue the combination of the alleged key characters to which Schmidt and I have already invited attention.

The three snakes listed above agree with *regularis* in having five lower labials in contact with an anterior chin-shield, but with *coronata* in having immaculate bellies only impinged upon laterally by the olive dorso-lateral coloration.

More recently, Angel has named a striking color variant whose range, however, appears to be coextensive with that of *regularis* and therefore without geographical significance. I would suggest that his two specimens may be examples in which the juvenile coloring has persisted into later life.

Variation. Midbody scale-rows 19; ventrals 168-176; anal divided; subcaudals 65-74; labials 8, the 4th and 5th entering the orbit; preocular 1; postoculars 2-3; temporals 1 + 2.

Coloration. So closely did these snakes resemble *Natrix o. olivacea* that I failed to distinguish them in the field. The absence of dark pigmentation on the labial sutures and the much more numerous ventrals serve at once to distinguish them.

It might also be remarked that the coloring of these Tana River *coronata* is duplicated by that of a Dar es Salaam specimen of *semiornata* which, moreover, has 1 + 2 temporals on the right side of the head; on the left, however, it has the normal 2 + 2 and its midbody scale-rows are 21.

Measurements. The largest ♂ (M. C. Z. 40558) measures 322 (247 + 75) mm., the ♀ (M. C. Z. 40323) measures 520 (410 + 110) mm.

PROSYMNA AMBIGUA STUHLMANNI (Pfeffer)

Ligonirostra stuhlmanni Pfeffer, 1893, Jahr. Hamb. Wiss. Anst., **10**, p. 78, pl. i, figs. 8-10: Usambara, Tanganyika Territory.

Prosymna variabilis Werner, 1909, Jahr. Nat. Ver. Wurttemb., **65**, p. 57: Moshi, Tanganyika Territory.

♀ (M. C. Z. 40560) Mapenya, near Witu, K. C. 28.v.34.

♂ (M. C. Z. 40561) Mkonumbi, K. C. 28.v.34.

♂ ♀ (M. C. Z. 40562-3) Ngatana, K. C. 20.vi.34.

Distribution. To the best of my belief these specimens constitute the first record of the genus in Kenya Colony.

Affinities. Boulenger (1894, p. 248) synonymized *stuhlmanni* with *ambigua* from Angola. The type of the latter, however, had 17 midbody scale-rows while the cotypes of *stuhlmanni*, as well as a dozen specimens from East Africa which I have examined, have 15. Furthermore, Mr. H. W. Parker writes on February 26, 1935 that there are 16 specimens in the British Museum from Zanzibar; Mombasa; Eastern Province, Uganda; Shire Valley; Mazoë, Rhodesia; and Kosi Bay, Zululand all with 15 midbody scale-rows. It seems reasonable, therefore, to recognize an eastern race characterized by 15 midbody scale-rows. Those with 15 range to Garamba, Belgian Congo (Schmidt, 1923, p. 89).

Barbour and Loveridge (1928, p. 121) and I (1933, p. 244) have referred to this matter before, suggesting that the name *bocagii* Boulenger from the Congo might be used. Apart from the fact that *stuhlmanni* has four years' precedence, I note that *bocagii* has a slightly more numerous ventral count than *stuhlmanni* and must be regarded as distinct.

Variation. Midbody scale-rows 15; ventrals 134-152; anal 1; subcaudals 20-32; labials 6, the 3rd and 4th entering the orbit; preocular 1, so minute on the left side of the head in M. C. Z. 40562 as to permit the prefrontal entering the orbit as in *bocagii*; postoculars 2 or 1 in M. C. Z. 40563 only; temporals 1 + 2 except in M. C. Z. 40560 where it is 1 + 1 as the lower temporal is fused with a labial.

Sexual differences. Sexes of this species, as judged by the counts of eight males and seven females, may be readily distinguished by the ventral and subcaudal range, *viz.*

Males have 133-140 ventrals and 30-34 subcaudals.

Females have 140-152 ventrals and 19-24 subcaudals.

Breeding. The Mapenya ♀ held three eggs measuring 20 x 6 mm. on May 28, 1934.

Measurements. The larger ♂ (M. C. Z. 40562) measures 238 (200 + 38) mm., the larger ♀ (M. C. Z. 40563) measures 254 (232 + 22) mm.

SCAPHIOPHIS ALBOPUNCTATUS Peters

Scaphiophis albopunctatus Peters, 1870, Monatsb. Akad. Wiss. Berlin, p. 645, pl. i, fig. 4: Kita, Guinea (*i.e.* French West Africa).

2 (M. C. Z. 39953-4) Sokoki Forest, K. C. 1932.

These two juvenile snakes are from a series of ten collected by Mr. H. J. Allen Turner, the rest are in the Coryndon Memorial Museum, Nairobi.

Affinities. I would suggest that the recently described *S. calciatii* Calabresi from near Cunama, Eritrea is a synonym of *S. raffreyi* Bocourt from Ethiopia, and that Boulenger (1894, p. 254) was in error in referring the latter to the synonymy of *albopunctatus*. Both Bocourt and Calabresi stress the same points of difference between their new species and *albopunctatus*.

Variation. Midbody scale-rows 23; ventrals 192-207; anals 2; subcaudals 57-69; labials 5; suboculars 3; preocular 1; postoculars 2 or 3 on right side of M. C. Z. 39954; temporals 4 + 5 or 5 + 5 on left side of M. C. Z. 39953; lower labials in contact with an anterior chin shield 3.

Coloration. Pale gray flecked and spotted with white, this juvenile coloring is very different from that of the adult.

Measurements. The larger, apparently a ♀, measures 402 (342 + 60) mm.

DASYPELTINAE

DASYPELTIS SCABER (Linnaeus)

(Plate 4, fig. 1)

Coluber scaber Linnaeus, 1766, Syst. Nat., 1, p. 384: Indiis.

- 10 (M. C. Z. 40564-73) Sipi, U. 13-23.xii.33.
- 1 (M. C. Z. 40574) Butandiga, U. 12.i.34.
- 1 (M. C. Z. 40575) Elgoni, K. C. 30.i.34.
- 4 (M. C. Z. 40576-9) Kaimosi, K. C. 10-16.ii.34.
- 1 (M. C. Z. 40580) Mt. Mbololo, K. C. 28.iv.34.
- 2 (M. C. Z. 40581-2) Lamu Id., K. C. 12.v.34.
- 1 (M. C. Z. 40583) Near Witu, K. C. 30.v.34.
- 1 (M. C. Z. 40584) Laini, Tana R., K. C. 6.vi.34.
- 1 (M. C. Z. 40585) Ngatana, K. C. 16.vi.34.

Distribution. Also 1 from Sokoki Forest (H. J. A. T.).

Native names. *Namagi* (Lugishu); *lucha* (Kipokomo).

Variation. The Mount Mbololo snake differs from all the others in having 2 preoculars and 3 + 5 temporals and in its coloring which was a bright coral pink above, paler pink below. This coloring harmonizes with the reddish soil of the region. The data of the rest of the series is as follows.

Midbody scale-rows 22-25; ventrals 208-232; anal 1; subcaudals 50-96, this last count, which I have rechecked, surpasses the range given by Boulenger (1894, p. 355), is of the ♂ snake from Lamu; labials 7, the 3rd and 4th entering the orbit, or 6 due to the fusion of

5th and 6th in M. C. Z. 40576 and on left side of M. C. Z. 40578; preocular 1 except as noted above; postoculars 1-2, five Sipi and one Kaimosi snake have a single postocular, twelve snakes have 2, the rest are azygous intermediates; temporals 1 + 3 (M. C. Z. 40579 only), 2 + 2 on ten sides, 2 + 3 on twenty-seven sides, 2 + 4 on four sides, 3 + 5 (M. C. Z. 40580 only).

Coloration. Wholly black specimens at Sipi and Kaimosi; uniform brown above at Sipi and Butandiga; bright coral pink on Mount Mbololo; uniform gray on Lamu Island; rhomboidal dorsal markings (var. B. of Boulenger) at Laini and Ngatana; rhomboidal dorsal markings and also ventrals conspicuously edged with black at Witu; rhomboidal dorsal markings confluent with lateral bars (var. E) on the young Elgoni snake.

Measurements. The largest ♂ (M. C. Z. 40570), a brown one, measures 615 (518 + 97) mm., the largest ♀ (M. C. Z. 40564), a black one, measures 825 (725 $\frac{1}{2}$ 100) mm.

Breeding. At Sipi a female held numerous eggs measuring 16 x 5 mm. on December 23, 1933; at Kaimosi another held fourteen eggs measuring 17 x 8 mm. on January 16, 1934.

Diet. One large Sipi female had her stomach and intestines distended with quantities of yolk, in bulk about equalling the contents of three hen's eggs.

Parasites. She was heavily parasitized with encysted nematodes.

BOIGINAE

CROTAPHOPELTIS HOTAMBOEIA HOTAMBOEIA (Laurenti)

Coronella hotamboeia Laurenti, 1768, Syn. Rept., p. 85: India orientali, i.e. Africa.

- 1 (M. C. Z. 40586) Mt. Debasien, U. 20.xi.33.
- 2 (M. C. Z. 40587-8) Mt. Mbololo, K. C. 17.iv.34.
- 1 (M. C. Z. 40589) Lamu Island, K. C. 14.v.34.
- 2 (M. C. Z. 40590-1) Peccatoni, K. C. 26.v.34.
- 2 (M. C. Z. 40592-3) Near Witu, K. C. 31.v.34.
- 1 (M. C. Z. 40594) Kau, Tana R., K. C. 4.vi.34.
- 18 (M. C. Z. 40595-611) Ngatana, K. C. 16-21.vi.34.
- 7 (M. C. Z. 40612-7) Golbanti, K. C. 22.vi.34.

Distribution. Seen also at Kibwezi and Malindi.

Native names. *Bafu* (Kitaita); *goomugalla* (Kipokomo). See also remarks under *Natrix o. olivacea*.

Variation. Despite the amazing amount of variation displayed by this coastal series of the White-lipped Snake, they are consistently of the typical lowland form with 19 midbody scale-rows and usually 1 preocular and 2 postoculars.

Midbody scale-rows 19; ventrals 157-174; anal single; subcaudals 40-65, Boulenger (1894, p. 90) gives 32-54 as the subcaudal range but half the above series are between 55-65; labials 6-9, all but nine sides, however, are the normal 8, the 3rd and 4th (two sides), the 3rd, 4th and 5th (15 sides), the 4th and 5th (42 sides), the 4th, 5th and 6th (5 sides), or the 5th and 6th (2 sides) entering the orbit, it will be observed that there is a strong tendency in this region for the 4th and 5th only to enter the orbit, this is in marked contrast to the thirty-four snakes collected by me (1933, p. 247) in the Central Lake Region which, without exception, had the 3rd, 4th and 5th entering the orbit as is normal for the species according to Boulenger (1896, p. 89); preoculars 1-2, the latter on the right side only of a Lamu snake and both sides on two Ngatana and a Golbanti reptile; postoculars 2-3 the latter on right side only of M. C. Z. 40588; frontal invariably well-separated from the preocular by the supraocular; temporals 1 + 1 (6 sides), 1 + 2 (59 sides), 1 + 3 (1 side); lower labials in contact with an anterior chin-shield 4 (9 sides), 5 (54 sides) or 6 (3 sides).

Coloration. These snakes do not display the white flecks so usual in snakes from further south. When about to cast their epidermis it becomes a smoky blue-gray, obscuring the usual black ground color.

On capturing the first Mbololo snake, though at 3,800 feet in a rotten log at the edge of the rain forest, I observed that the iris of its eye was grayish olive, *not* red, so was quite prepared on later examination to find that, with the exception of three postoculars on the right side of its head, its scale characters were those of the typical, or lowland, form.

Measurements. The largest ♂ (M. C. Z. 40595) measures 564 (470 + 94) mm., the largest ♀ (M. C. Z. 40587) measures 519 (446 + 73) mm.

Sex. This does not appear to be determinable from scale counts, thus fifteen males have a ventral count of 157-166 and subcaudal of 44-65; twelve females have from 159-174 ventrals and 40-54 subcaudals.

| | | | | | | |
|--|---|---|---|---|---|-------------------|
| <i>Breeding.</i> The Kau ♀ held several eggs measuring 13 x 4 mm. on June 4. | | | | | | |
| An Ngatana | ♀ | " | 4 | " | " | 27 x 12 mm. " 16. |
| " | ♀ | " | 6 | " | " | 17 x 7 mm. " 17. |
| " | ♀ | " | 3 | " | " | 32 x 8 mm. " 17. |
| A Golbanti | ♀ | " | 5 | " | " | 35 x 11 mm. " 26. |

It should be added that only two of the batch of three eggs reached the dimensions given, the third egg was considerably smaller. Contrary to what one usually finds, the female producing the small complement of four eggs was of large size, measuring 500 mm. over all.

Diet. A Peccatoni snake held amphibian bones; one from Ngatana had swallowed both a frog (*Rana m. mascareniensis*) and a toad (*Bufo steindachnerii*); toads of this species were also recovered from the stomachs of two Golbanti reptiles.

Parasites. A tapeworm (*Ophiotaenia crotaphopeltis*) was taken from the alimentary tract of a Golbanti snake in whose stomach were worms.

Habitat. The young Debasien snake was cut in half by one of my men engaged in cutting down grass on the bank of the Amaler River at 5,000 feet, another of similar size was found on the river bank, dead and macerated. The Lamu specimen was taken in a garden. In addition to those captured at Peccatoni, was a young one which escaped me, it was lying at the base of a bussu palm in a swampy area flooded by the recent heavy rains.

CHAMAETORTUS AULICUS AULICUS Günther

Chamaetortus aulicus Günther, 1864, Proc. Zoöl. Soc. London, p. 310, pl. xxvi, fig. 2: Zambesi.

♀ (M. C. Z. 40619) Kibwezi, K. C. 30.iii.34.

♂ (M. C. Z. 40620) Ngatana, K. C. 17.vi.34.

Distribution. This rare snake has previously been recorded from Kibwezi by Sternfeld (1908, p. 244), constituting, I believe, the first record of its occurrence in Kenya Colony. A second example, now in the Coryndon Memorial Museum, was obtained by Mr. H. J. Allen Turner at Fundi Isa, north of Malindi, in June 1932.

Native name. *Tambasi* (Kipokomo).

Affinities. Trinomials are employed on account of *C. a. ellenbergeri* Chabanaud, 1917 (1916) from Lambarené, Congo. It differs from the typical form in the preocular being in contact with the frontal; labials 9, the 4th, 5th and 6th entering the orbit; ventrals 209; subcaudals 95 and its color, a uniform greyish brown.

Variation. Midbody scale rows 17; ventrals 178-187; anal single; subcaudal 93 on ♀; labials 8, the 3rd, 4th and 5th entering the orbit; preocular 1 + the loreal which enters the eye; postoculars 2; temporals 1 + 1; lower labials in contact with an anterior chin shield 4-5.

Measurements. The ♂ has the tip of its tail lacking. The ♀ measures 607 (458 + 149) mm.

HEMIRHAGERRHIS KELLERI Boettger

Hemirhagerrhis kelleri Boettger, 1893, Zoöl. Anz., **16**, p. 129: Webi Jhal, Abdallah and south of Ogaden, Ethiopia.

Amplorhinus taeniatus Sternfeld, 1908, Mitt. Zoöl. Mus. Berlin, **4**, p. 244, fig. 3. and 1910, Fauna der deutschen Kolonien, **3**, Die Schlangen Deutsch-Ostafrika, p. 27 (reprint), fig. 27: Lamu Island, Kenya Colony.

1 (M. C. Z. 40621) Mkonumbi, K. C. 28.v.34.

Distribution. This specimen is almost topotypic of Sternfeld's *A. taeniatus*, for Mkonumbi is on the mainland almost opposite Lamu Island and there is a daily dhow service between the two during most of the year.

The specimen of *kelleri* listed by Boulenger (1896, p. 649) as collected by the late Sir F. J. Jackson in Uganda, is now M. C. Z. 26928. In view of the fact that Jackson visited Witu, eighteen miles inland from Mkonumbi, and that other herpetological material which he collected on his journey to Uganda was erroneously attributed to 'Uganda' (e.g. *Chamaeleon jacksoni* Boulenger from Kikuyu), I think that we are justified in believing that this snake was taken in what is now called Kenya Colony. I mention this here as my reason for omitting *kelleri* from the Uganda list.

A snake in the Nairobi Museum (No. I 100) without locality, was erroneously referred by me (1916, pp. 80 and 85) to *H. kelleri*. On recent examination I find that it is an example of *Pseudoboodon lemniscatus* of Ethiopia. Whether it was taken on the Kenya side of the Kenya-Ethiopian boundary is of course uncertain, though likely, but until substantiated *P. lemniscatus* cannot be admitted to the Kenya list.

Sternfeld (1908a, *loc. cit. supra*, p. 243), in his introduction to the paper in which he described *Amplorhinus taeniatus* and *Rhinocalamus meleagris* makes acknowledgement to various authors for material, among them "Denhardt (Lamu, Pokomonie)." Though he gives localities for the thirty-five other species mentioned in the paper, strangely enough he omits mention of the type localities of the two mentioned above. Later in the year, however, he added "Lamu Island."

It should be remembered that "Lamu" formerly was applied to the mainland opposite the island, later being called "Lamu district," at the same time it was applicable to the township of Lamu, Lamu Island. "Pokomonie" which literally means the "place of the Pokomo

tribe" is the name of a creek close to Wange where Denhardt had an abortive coconut plantation. This is that Wange which Stejneger (1893, p. 712) was misled in placing on Manda Island opposite the creek. No Wapokomo live on the creek today, the tribe being restricted to a narrow strip bordering the Tana River from Kidori (1 S.) to Charra 2° 30' S.) near the mouth of the river. This is the region generally known today as Pokomoni.

While it is true that Gustav Denhardt's headquarters were on Lamu Island, I visited his plantation and house, the latter in a semi-ruinous state, he and his brother had numerous interests on the mainland in addition to the Wange venture. I learned that he made several business trips up the Tana River. While it is entirely possible that the snakes which became the types of *taeniatus* and *meleagris* may have been accidentally introduced into Lamu, possibly with the fuel which constituted another of Denhardt's business undertakings, it seems more probable that a burrowing type like *Rhinocalamus* would have been taken at Wange, along the Pokomoni creek, or in the Pokomo country bordering the Tana.

The fact that I spent a week in searching for these two species on Lamu Island without finding them, is no proof that they do not occur there, but in view of the vagueness attaching to the localities on other Denhardt material, it is at least possible that they were taken at Lamu in its mainland sense, if not Pokomoni.

Variation. Midbody scale-rows 17; ventrals 157; anals 2; subcaudals 78; labials 8, the 4th and 5th entering the orbit; preoculars 2 on the right, 1 on the left side; postoculars 2; temporals 2 + 3.

Measurements. Total length 212 (162 + 50) mm.

RHAMPHIOPHIS RUBROPUNCTATUS (Fischer)

Dipsina rubropunctata Fischer, 1884, Jahr. Hamburg. Wiss. Anst., 1, p. 7, pl. i, fig. 3: Near Arusha at the foot of Kilimanjaro, Tanganyika Territory.

1 (M. C. Z. 40650) Voi, K. C. 23.iv.34.

♀ (M. C. Z. 40651) Mt. Mbololo, K. C. 27.iv.34.

Native names. The Wataita distinguish the spotted young from the uniform adult under the names of *manganga* (young) and *ngunuku* (adult).

Variation. Midbody scale-rows 19; ventrals 235-237; anal divided; subcaudals 149-154; labials 8-9, the 4th and 5th or 5th and 6th entering the orbit; preoculars 2; postoculars 2; loreal 1; temporals 2 + 4, 3 + 4, or 4 + 4.

Measurements. The ♀ measures 1608 (1092 + 516) mm., and appears to be the largest recorded example of this rare species.

RHAMPHIOPHIS ROSTRATUS Peters

Rhamphiophis rostratus Peters, 1854, Monatsb. Akad. Wiss. Berlin, p. 624; 1882, Reise nach Mossamb., 3, p. 124, pl. xix, fig. 1: Tete; Mesuril; Quitangonha, Mozambique.

- 2 (M. C. Z. 40652-3) Voi, K. C. 24-27.iv.34.
- 3 (M. C. Z. 40654-6) Lamu Island, K. C. 7.v.34.
- 1 (M. C. Z. 40657) Peccatoni, K. C. 26.v.34.
- 1 (M. C. Z. 40658) Mkonumbi, K. C. 28.v.34.
- 1 (M. C. Z. 40659) Witu, K. C. 31.v.34.

Distribution. Also 2 from Sokoki Forest (H. J. A. T.)

Native names. *Kitangu* (for adults) and *mbono* (for spotted young) in Kiamu.

Variation. Midbody scale-rows 17; ventrals 154-187; anal divided; subcaudals 90-118; labials 8, the 5th only entering the orbit; preoculars 3 (ten sides) or 4 (six sides); postoculars 2 except on the left side of M. C. Z. 40659 where there are 4; temporals 2 + 3, rarely 2 + 4 (three sides).

Measurements. The largest ♂ (M. C. Z. 40659) measures 1025 (715 + 310) mm., the largest ♀ (M. C. Z. 40652) measures 1334 (922 + 412) mm.

Dict. A very young snake from Peccatoni had the limbs of a frog (? *Kassina senegalensis*) in its stomach.

PSAMMOPHIS SIBILANS (Linnaeus)

Coluber sibilans Linnaeus (part), 1766, Syst. Nat., 12th ed., 1, p. 383: "Asia".

- 5 (M. C. Z. 40622-6) Sipi, U. 13-27.xii.33.
- 1 (M. C. Z. 40627) Butandiga, U. 8.i.34.
- 4 (M. C. Z. 40628-31) Bukori, K. C. 18.i.34.
- 1 (M. C. Z. 40632) Kaimosi, K. C. 1.iii.34.
- 1 (M. C. Z. 40633) Kibwezi, K. C. 23.iii.34.
- 1 (M. C. Z. 40634) Voi, K. C. 12.iv.34.
- 2 (M. C. Z. 40635-6) Mt. Mbololo, K. C. 17.iv.34.
- 1 (M. C. Z. 40637) Golbanti, K. C. 3.v.34.
- 1 (M. C. Z. 40642) Near Witu, K. C. 31.v.34.
- 4 (M. C. Z. 40644-7) Ngatana, K. C. 12-15.vi.34.
- 1 (M. C. Z. 40648) Malindi, K. C. 30.vi.34.

Distribution. Also 4 from Sokoki Forest (H. J. A. T.)

Native names. *Namasanurugi* (Lugishu); *aerenet* (Kimasai); *ndasiangombe* (Kitaita); *juaka* or *paa* (Kipokomo).

Variation. Midbody scale-rows 17; ventrals 158-181; anal divided; subcaudals 81-106; labials 8, the 4th and 5th entering the orbit except on left side of M. C. Z. 40636 where there are 7, the 3rd and 4th entering the orbit; preocular 1; postoculars 2; temporals 2 + 2 on 24 sides, 2 + 3 on 20 sides; rostral as broad as deep in 13 snakes, broader than deep in 9, both conditions occurring in snakes from the same locality.

Coloration. The ventrals of the forest-edge specimens from the Central African material (Sipi, Butandiga, Kaimosi) exhibit well-defined, though dusky, lateral lines, in the coastal specimens these are represented by dashes or dots except a young Ngatana snake which is pure white below. One of the Mbololo snakes (M. C. Z. 40636) apparently represents Var. A. of Boulenger's "Catalogue of Snakes" (1896, p. 161) it is pure white below while the back is brown and striped like that of *P. subtaeniatus*.

Measurements. The largest ♂ (M. C. Z. 40622) measures 1095 mm. from snout to anus, the largest ♀ (M. C. Z. 40624) measures 1303 (935 + 368) mm.

Breeding. Only three snakes in the above series held developing ova.

| | | | | | | |
|---------------------------|---|------|----|------|-----------|-------------|
| Sipi, December 13, 1933. | ♀ | held | 4 | eggs | measuring | 13 x 6 mm. |
| Bukori, January 18, 1934. | ♀ | " | 10 | " | " | 27 x 10 mm. |
| " | " | ♀ | 7 | " | " | 38 x 19 mm. |

These last were quite ready for laying.

Diet. Rodent fur in a Sipi snake; a striped mouse (*Lemniscomys s. massaicus*) in the Butandiga reptile; a tree rat (*Oecomys b. editus*) swallowed by the Kaimosi specimen, while a tree lizard (*Agama atricollis*) was recovered from one of the Bukori series.

Parasites. All these Bukori snakes were heavily infested with nematodes (*Physaloptera paradoxa*) as was the Kaimosi specimen. A few in one of the Mkonumbi snakes and one only in the Malindi reptile.

PSAMMOPHIS SUBTAENIATUS Peters

Psammophis sibilans var. *subtaeniatus* Peters, 1882, Reise nach Mossamb., 3, p. 121: Boror and inland from Tete, Mozambique.

- 3 (M. C. Z. 40638-40) Lamu Island, K. C. 8.v.34.
- 1 (M. C. Z. 40841) Mkonumbi, K. C. 28.v.34.
- 1 (M. C. Z. 40643) Near Witu, K. C. 31.v.34.
- 1 (M. C. Z. 40649) Changamwe, K. C. 5.vii. 34.

Native name. *Mchezawanawaki* (Kiamu). The literal translation is "Plays with the women" the explanation being that when they are working in their gardens the women are scared and stampeded by the snake's appearance. The name was widely known and not the concoction of a native on the spur of the moment.

Variation. Midbody scale-rows 17; ventrals 160-167; anal divided; subcaudals 100-113; labials 8, the 4th and 5th entering the orbit; 4 lower labials in contact with the anterior chin shields; preocular 1 or 2 on right side of M. C. Z. 40641 only; postoculars 2; loreal 1; temporals 2 + 2 on right side, 2 + 3 on left side of every snake except M. C. Z. 40638 which had 2 + 2 on both sides.

Coloration. All have the pair of black lines along the belly sharply defined and clear.

Measurements. The largest ♂ (M. C. Z. 40641) measures 1182 (792 + 390) mm., the largest ♀ (M. C. Z. 40643) measures 835 mm. from snout to anus, the tail is truncated.

Dict. A young frog (*Rana edulis*) was recovered from the stomach of a very emaciated Mkonumbi snake.

Parasites. The other Mkonumbi snake had nematodes only in its stomach.

PSAMMOPHIS PUNCTULATUS Duméril & Bibron

Psammophis punctulatus Duméril & Bibron, 1854, *Erpét. Gén.*, 7, p. 897: Arabia.

Psammophis punctulatus var. *trivirgatus* Peters, 1878, *Monatsb. Akad. Wiss. Berlin*, p. 206: Taita, Kenya Colony.

3 (M. C. Z. 40660-2) Mt. Mbololo, K. C. 20.iv.34.

Native name. *Ndasiangombe* (Kitaita).

Variation. Midbody scale-rows 17; ventrals 186-188; anal divided; subcaudals 118-152; labials 8, the 4th and 5th entering the orbit or 9, the 5th and 6th; preocular 1 in contact with or separated from the frontal; postoculars 2; loreal 1; temporals 1 + 2, 2 + 2 or 2 + 3.

Boulenger (1896, p. 159) gives the subcaudal range as 130-158, I might add that I have verified the new low count of 118 on an uninjured tail (M. C. Z. 40660).

Measurements. The ♂ (M. C. Z. 40662) measures 883 (560 + 323) mm., the larger ♀ (M. C. Z. 40660) measures 1530 (1030 + 500) mm.

Dict. A lizard (*Latastia l. revoili*) was recovered from the stomach of one of these Spotted Sand Snakes.

PSAMMOPHIS BISERIATUS Peters

Psammophis biseriatus Peters, 1881, Sitzb. Ges. Naturf. Freunde Berlin, p. 88: Taita, Kenya Colony.

1 (M. C. Z. 40663) Tsavo, K. C. 4.iv.34.

3 (M. C. Z. 40664-6) Voi, K. C. 7-10.iv.34.

9 (M. C. Z. 40667-74) Mt. Mbololo, K. C. 17-30.iv.34.

1 (M. C. Z. 40675) Malindi, K. C. 30.vi.34.

Distribution. Mount Mbololo being in Taita (i.e. Utaita), the series from that locality are topotypes.

Native name. *Mararinga* (Kitaita).

Variation. Midbody scale-rows 15; ventrals 143-152; anal divided except M. C. Z. 40671 which has a single anal; subcaudals 92-125; labials 9, the 5th and 6th entering the orbit except on the right side of M. C. Z. 40671 which has the 4th, 5th and 6th entering; at first sight it would appear that Tanganyika snakes might be separated as having three labials entering the orbit, unfortunately this condition crops up elsewhere—in Somaliland for example; preoculars 1, or 2 in M. C. Z. 40667 and on right side of 40666; postoculars 2; temporals 1 + 2 (two sides), 1 + 3 (one side), 2 + 2 (eighteen sides), or 2 + 3 (seven sides); labials in contact with anterior chin-shield 5, or 4 on left side of M. C. Z. 40670 only.

Measurements. The largest ♂ (M. C. Z. 40668) measures 872 (541 + 331), the largest ♀ (M. C. Z. 40667) measures 1020 (660 + 360) mm.

Diet. A very large lizard (*Latastia l. revoili*) in the Tsavo snake, a skink (*Mabuya planifrons*) in one from Voi, chameleons (*C. d. roperi*) in two of the series from Mount Mbololo.

THELOTORNIS KIRTLANDII (Hallowell)

L(eptophis) Kirtlandii Hallowell, 1844, Proc. Acad. Nat. Sci. Philad., p. 62: Liberia.

4 (M. C. Z. 40676-9) Mt. Mbololo, K. C. 23-29.iv.34.

Distribution. Also 4 from Sokoki Forest (H. J. A. T.)

Native name. *Mraringa* (Kitaita).

Variation. Midbody scale-rows 19; ventrals 164-172; anal divided; subcaudals 148-166; labials 8, the 4th and 5th or 3rd, 4th and 5th (in M. C. Z. 40676 only) entering the orbit; lower labials in contact with the anterior chin shields 4-5; preoculars 1; postoculars 3; temporals 1 + 2.

Measurements. The largest ♂ (M. C. Z. 40676) measures 1422 (821 + 601) mm., the largest ♀ (M. C. Z. 40677) 1185 (713 + 472) mm.

DISPHOLIDUS TYPUS (Smith)

Bucephalus typus A. Smith, 1829, Zoöl. Journ., 4, p. 441: Old Latakoo, South Africa.

- 1 (M. C. Z. 40688) Butandiga, U. 8.i.34.
- 3 (M. C. Z. 40689-91) Bukori, K. C. 18.i.34.
- 8 (M. C. Z. 40692-9) Kaimosi, K. C. 12-28.ii.34.
- 5 (M. C. Z. 40700-4) Mt. Mbololo, K. C. 19-28.iv.34.

Distribution. A battered one also seen at Kibwezi, and others from Matalani (H. J. A. T.), Sokoki Forest (H. J. A. T.), and Fundi Isa (H. J. A. T.) in Nairobi Museum.

Native name. *Ikumbu* (Kitaita, but also applied to the Spotted Wood Snake (*Philothamnus s. semivariatus*.)

Variation. Midbody scale-rows 19-21 (the latter on M. C. Z. 40702-4 only); ventrals 169-191; anal divided; subcaudals 87-119; labials 7, the 3rd and 4th entering the orbit, except on the right side of M. C. Z. 40695 where the 3rd, 4th and 5th enter; preoculars 1; postoculars 3; temporals 1 + 2, or 1 + 1 on right side M. C. Z. 40700, 1 + 3 on M. C. Z. 40702, 2 + 3 on M. C. Z. 40694.

Coloration. A small boy brought in an interesting pair of these Tree Snakes (M. C. Z. 40703-4). ♂. Top of head bright brick red like the red soil of the region, back nut brown but the keel of each scale partly white. Below, buffy white. ♀. Top of head as in the male but the back reddish brown, tail bright pink. Below, pink.

Green examples were taken at Bukori, Kaimosi and Mount Mbololo. Brownish ones at Butandiga, Bukori, Kaimosi and Mount Mbololo.

Measurements. The largest ♂ (M. C. Z. 40703) measures 1298 (962 + 336) mm., the largest ♀ (M. C. Z. 40704) measures 1391 (1073 + 318) mm.

Dict. Chameleons, viz. *C. b. höhnelii* at Butandiga; *C. g. gracilis* in all three Bukori snakes; *C. b. bitaeniatus*, four, in three Kaimosi snakes, *C. d. roperi* in two Mount Mbololo specimens, bird's feathers in a third.

CALAMELAPS UNICOLOR (Reinhardt)

Calamaria unicolor Reinhardt, 1843, Dansk, Vidensk. Selsk. Skrift., 10, p. 236, pl. i, figs. 1-3: Guinea, West Africa.

♀ (M. C. Z. 40705) Mt. Mbololo, K. C. 27.iv.34.

♀ (M. C. Z. 40706) Ngatana, K. C. 19.vi.34.

♂ (M. C. Z. 40707) Changamwe, K. C. 4.vii.34.

Native name. *Ngogoma* (Kipokomo).

Variation. Midbody scale-rows 17-19; ventrals 163-203; anal divided; subcaudals 16-27; labials 6, the 3rd and 4th entering the orbit except in M. C. Z. 40705 which has 5, the 2nd and 3rd entering the orbit; lower labials in contact with the anterior chin shields 4; preocular 0; postocular 1; temporal 1; loreal 0.

The rostral apparently develops with age as in *Prosymna*, it is not distinguishable from that of a *Rhinocalamus* of similar size so should be avoided as a key character.

Measurements. The ♂ measures 296 (265 + 31) mm., the larger ♀ (M. C. Z. 40705) measures 434 (410 + 24) mm.

Diet. Shortly after capture, the Changamwe snake disgorged a wolf snake (*Lycophidion c. acutirostre*) only 20 mm. shorter than itself. The similarity in the parallel development of these two blackish, burrowing snakes was striking. The head of the wolf snake was too digested for a labial count, but it was a ♂ with midbody scale-rows 17; ventrals 154; anal single; subcaudals 31, having 9 ventrals less, and 4 subcaudals more than its vanquisher.

MICRELAPS BICOLORATUS Sternfeld

Micrelaps bicoloratus Sternfeld, 1908, Sitzber. Ges. Naturf. Freunde Berlin, p. 93: Kibwezi, Kenya Colony.

Rhinocalamus meleagris Sternfeld, 1908, Mitt. Zoöl. Mus. Berlin, 4, p. 244, fig. 4: no locality given, later (1910) stated as Lamu Island.

♀ (M. C. Z. 40708) Tsavo Station, K. C. 5.iv.34.

Distribution. I failed to secure this rare little burrowing snake at Kibwezi from which Tsavo is distant some fifty miles.

Synonymy. I believe that Sternfeld was led to describe *Rhinocalamus meleagris* by a too slavish adherence to the key in the Catalogue of Snakes, vol. 3 (1896, p. 31). In his *bicoloratus* the postocular is barely in contact with a temporal, in *meleagris* it is well separated. Some years ago, I (1923, p. 889) referred a snake from Gonya, near Kilimanjaro to *meleagris*. In 1925 the Museum of Comparative Zoölogy received another Tanganyika specimen identified as *meleagris* by Franz Werner. The same year Angel (1925, p. 36) recorded *meleagris* from Samburu, near Mombasa. The Tsavo snake is undoubtedly conspecific with all

these yet geographically they come from round the type locality of *bicoloratus*.

If we arrange the available scale counts for these snakes, we find that those from the farthest north agree closely with those from the furthest south.

Type of meleagris from Lamu Island has 251 ventrals and 22 subcaudals.

| | | | | | | | |
|----------------------------|------------------|---|-----|---|---|----|---|
| <i>Type of bicoloratus</i> | Kibwezi | " | 226 | " | " | 16 | " |
| M. C. Z. 40708 | Tsavo | " | 235 | " | " | 23 | " |
| Paris Museum | Samburu | " | 202 | " | " | 28 | " |
| Nairobi Museum | Gonya | " | ? | " | " | 28 | " |
| M. C. Z. 20948 ex. | Tanganyika Terr. | " | 256 | " | " | 23 | " |

Sternfeld's figures show the frontal of *bicoloratus* to be much wider than the supraocular while it is equal to them in *meleagris*. In this character our two snakes agree with *bicoloratus* but they agree with *meleagris* in having the postocular separated from the temporal.

Variation. Midbody scale-rows 15; ventrals 235; anal divided; subcaudals 23; labials 7, the 3rd and 4th entering the orbit; preocular 0; postocular 1; loreal 0; temporals 1 + 1.

Measurements. ♀ measures 273 (256 + 17) mm.

APARALLACTUS TURNERI Loveridge

Aparallactus turneri Loveridge, 1935, Bull. Mus. Comp. Zoöl., 79, p. 9: Sokoki Forest, near Malindi, Kenya Colony.

- 1 (M. C. Z. 40120-1) Peccatoni, K. C. 24.v.34.
- 2 (M. C. Z. 40121-2) Mkonumbi, K. C. 28.v.34.
- 2 (M. C. Z. 40123-4) Near Witu, K. C. 31.v.34.

Variation. Midbody scale-rows 15; ventrals 120-139; anal single; subcaudals 31-42; labials 6, the 2nd and the 3rd entering the orbit; preocular 1; postocular 2, or 1 in the type only; symphyisial not in contact with the chin shields or almost so in M. C. Z. 40124.

Measurements. The largest ♂ (M. C. Z. 40120) measures 202 (167 + 35) mm.

APARALLACTUS CAPENSIS Smith

Aparallactus capensis A. Smith, 1849, Illus. Zoöl. S. Africa, Rept., App. p. 16: Kaffirland eastward of Cape Colony.

- 2 (M. C. Z. 40709-10) Mt. Mbololo, K. C. 17.iv.34.

Distribution. These constitute the second record of *capensis* for Kenya Colony to the best of my belief, they involve *punctatolineatus* also for reasons explained below.

Native name. *Mowa* (Kitaita, but generic).

Variation. *A. punctatolineatus* Boulenger only differs from *capensis* in having 6 or 7 upper labials with the 2nd and 3rd entering the orbit while *capensis* has 7 upper labials, the 3rd and 4th entering the orbit, apparently there is no second distinguishing character. Both the Mbololo snakes were taken by me on the same day yet M. C. Z. 40709 agrees with *capensis*, M. C. Z. 40710 with *punctatolineatus*, the latter having only 6 labials of which the 2nd and 3rd enter the orbit.

A. punctatolineatus is known from two specimens from Angola and Nyasaland and is therefore within the range of *capensis*. I strongly suspect that it only occurs as an aberration of *capensis*. I imagine that Tornier's (1897, p. 79) records of *nigriceps*, copied by Sternfeld (1910a, p. 36), from Tanga and Marangu, Kilimanjaro are similar aberrant *capensis* for the latter author (1910a, p. 36) records *capensis* from Tanga and Kilimanjaro on the same page.

It might be as well to add that in these Mbololo snakes the symphysial *is* in contact with the anterior chin-shields and these snakes have only a single postocular which is well separated from the temporals. It is clear therefore that they cannot be referred to either *wernerii* of the Usambara or *jacksonii* of Mount Kilimanjaro which was more to be expected.

Midbody scale-rows 15; ventrals 140-163; anal entire; subcaudals 37 and mutilated; preocular 1.

Measurements. The larger ♀ (M. C. Z. 40709) measures 268 + (230 + 38 +) mm., its tail-tip being missing.

Diet. The stomach of the smaller contained two centipedes of a species of which a tubeful were collected.

Habitat. One was taken beneath a rotting log in the forestry nursery at 4,000 feet, the other beneath a stone on the eastern slope at 4,500 feet approximately.

APARALLACTUS CONCOLOR (Fischer)

Uriechis concolor Fischer, 1884, Jahr. Hamburg Wiss. Anst., **1**, p. 4, pl. i' fig. 1: Arusha, Tanganyika Territory.

1 (M. C. Z. 40711) Voi, K. C. 17.iv.34.

3 (M. C. Z. 40712-4) Mt. Mbololo, K. C. 23-30.iv.34.

Native name. *Mowa* (Kitaita, but generic).

Corrigenda. Angel (1925, p. 36) has already recorded this species

from Bura near Mbololo but under the erroneous identification of *Elapops modestus*. I have examined the snake in question.

Variation. Midbody scale-rows 15; ventrals 143-158; anal entire; subcaudals 58-62; labials 7, the 3rd and 4th entering the orbit; infralabials in contact with the anterior chin shields 4; preocular 1; postocular 1; loreal 0; temporals 1 + 2.

Measurements. The larger ♂ (M. C. Z. 40714) measures 342 (280 + 62) mm., the larger ♀ (M. C. Z. 40711) measures 520 (420 + 100) mm.

APARALLACTUS ULUGURUENSIS Barbour & Loveridge

Aparallactus uluguruensis Barbour & Loveridge, 1928, Mem. Mus. Comp. Zool., **50**, p. 132: Nyange, Uluguru Mountains, Tanganyika Territory.

Aparallactus concolor boulengeri Scortecci, 1931, Atti. Soc. Ital. Milano, **70**, p. 212: Villa Duca Abruzzi and Inland from Mogadish, Italian Somaliland.

♀ (M. C. Z. 40715) Ngatana, K. C. 17.vi.34.

Distribution. This is the first record of the occurrence of this species in Kenya Colony, but not wholly unexpected as other rain-forest forms occur at Ngatana. Its occurrence in Italian Somaliland, however, leads one to suppose that it cannot be regarded as a rain-forest form; its distribution prevents its being treated as a race of *concolor*.

Native name. Penge (Kipokomo).

Variation. Midbody scale-rows 15; ventrals 155; anal single; subcaudals 47; labials 7, the 3rd and 4th entering the orbit; preocular 1; postocular 1; loreal 0; temporals 1 + 2.

This specimen agrees with the ten types in the symphyisial being broadly in contact with the anterior chin shields and the nasal in contact with the preocular so that the second supralabial is separated from the prefrontal. These serve to separate it from *concolor*. The character of how much rostral, as seen from above, stands in relation to its distance from the frontal, does not seem to be of specific significance. While there are only three lower labials in contact with the anterior chin shield on the left (as in the ten types of *uluguruensis*), there are barely four on the right as in *concolor*.

Measurements. ♀ measures 370 (300 + 70) mm.

Breeding. On June 17, 1934, there were 2 eggs measuring 12 x 5 mm. in her oviduct.

ELAPINAE

ELAPSOIDEA GÜNTHERII Bocage

Elapsoidea Güntherii Bocage, 1866, Journ. Sci. Lisboa, 1, p. 70, pl. i, figs. 3-3b; Cabinda, Portuguese Congo and Bissao, Portuguese Guinea.

1 (M. C. Z. 40717) Nairobi, K. C. 30.x.33.

2 (M. C. Z. 40718-9) Sipi, U. 12.xii.33.

6 (M. C. Z. 40720-4) Kaimosi, K. C. 13-28.ii.34.

Native name. *Mugoya* (Lugishu).

Variation. Midbody scale-rows 13; ventrals 156-167; anal entire; subcaudals 18-26; labials 7, the 3rd and 4th entering the orbit; preocular 1; postoculars 2; temporals 1 + 3; internasals shorter than the prefrontals; symphyisial separated from the chin shields.

Coloration. The young Nairobi snake is of the red-and-white banded type (*güntherii*), the rest are uniformly black or black with pairs of light transverse lines (*nigra*). For a discussion of the relationship of these two forms see Barbour & Loveridge (1928, p. 134) based on a series of forty-seven snakes from the Uluguru and Usambara Mountains.

Measurements. The largest ♂ (M. C. Z. 40722) measures 623 (575 + 48) mm., the largest ♀ (M. C. Z. 40721) measures 630 (581 + 49) mm.

NAJA MELANOLEUCA Hallowell

Naia haie var. *melanoleuca* Hallowell, 1857, Proc. Acad. Nat. Sci. Philad., p. 61; Gaboon, West Africa.

3 (M. C. Z. 40725-7) Sipi, U. 19-23.xii.33.

1 (M. C. Z. 40728) Butandiga, U. 12.i.34.

16 (M. C. Z. 40730-41) Kaimosi, K. C. 14-28.ii.34.

Native names. *Swila* (Luganda); *wahobi* (Lugishu). The first name is also commonly applied to the Egyptian Cobra (*N. haje*) in western Tanganyika Territory.

Local European name. At Kaimosi I found the Black-and-white Cobra was erroneously called a "Black Mamba" by the American and European residents.

Variation. Midbody scale-rows 19; ventrals 206-220; anal entire; subcaudals 57-68; labials 7, the 3rd and 4th entering the orbit, the 6th constantly largest and in contact with the postoculars; rostral invariable broader than deep; preoculars 1, or 2 in M. C. Z. 40727 only; postoculars 3, or 2 on eight sides only; temporals 1 + 1 on two sides, 1 + 2 on twelve, 1 + 3 on twenty-five, 2 + 3 on one.

Measurements. The largest ♂ (M. C. Z. 40730) measures 2112 (1790 + 322) mm., the largest ♀ (M. C. Z. 40731) 1700 (1440 + 260) mm.

Weight. The six foot, ten and three-quarter inch male weighed four pounds on a spring balance when freshly killed, its stomach being empty.

Breeding. On February 26, 1934, a large Kaimosi ♀ (M. C. Z. 40729) held 15 eggs, measuring 60 x 30 mm. ready for deposition.

Dict. Rodent fur in a Sipi snake while the following mammals were found in three of the Kaimosi series, *Dasymys h. helukus*, *Leomys s. massaicus*, *Arvicanthia a. nubilans*.

Parasites. Ticks (*Aponomma laeve*) were present on several cobras in the Kaimosi series but no internal parasites except a nematode (*Physaloptera sp.*), and three small nematodes (*Kalicephalus sp.*) recovered from a Sipi male.

Enemies. A shrivelled old hag of an Mgishu killed two big cobras in her garden without damaging either, the larger was about five and a half feet in length.

NAJA NIGRICOLLIS NIGRICOLLIS Reinhardt

Naja nigricollis Reinhardt, 1843, Dansk. Vidensk. Selsk. Skrift, 10, p. 269, pl. iii. figs. 5 and 7: Guinea, West Africa.

♀ (M. C. Z. 40742) Kibwezi, K. C. 29.iii.34.

Variation. Midbody scale-rows 27; the highest on record except Sternfeld's for 27, without locality, from Hoffman¹; ventrals 220; anal entire; subcaudals 59; labials 6, the 3rd entering the orbit; lower labials in contact with the anterior chin shields 4; preocular 1; postoculars 3; temporals 2 + 5 and 2 + 4.

Coloration. Bright reddish pink above with an encircling collar of black which covers seven ventrals on the "throat," a black blotch below the orbit.

This is the rare red variety whose first mention in literature would appear to be that of Patterson (1907, p. 164) in "The Maneaters of Tsavo." where he writes: "a great red snake, about seven feet long, gazing at me from the side of my camp-bed." The only other examples that I have seen are two from the base of Mount Longido,

¹As Hoffman lived at Kibwezi the snake doubtless came from there. Sternfeld refers it to "var. *pallida*," probably the reddish pink hue had faded before he saw it.

Tanganyika Territory which is in the same patch of red-soil, thorn-bush country as Tsavo and Kibwezi.

Measurements. ♀ measures 1372 (1168 + 204) mm.

DENDRASPIS JAMESONI KAIMOSAE Loveridge

(Plate 4, fig. 2)

Dendraspis jamesoni kaimosae Loveridge, 1936, Proc. Biol. Soc. Washington, 49, p. 64: Kaimosi, Kakamega district, Kenya Colony.

7 (M. C. Z. 40743-8) Kaimosi, K. C. 10-22.ii.34.

Remarks. The above series consists of the type and paratypes of the eastern form characterized by a uniformly black tail and fewer subcaudals, viz. 94-104 instead of 103-122.

Dict. A tree rat (*Oenomys b. editus*) in one, a swamp rat (*Otomys t. elgonis*) in another.

Habitat, etc. The seven foot snake which had swallowed a tree rat was lying coiled on the horizontal, spreading branch of a tree close to camp. The head was protected by the coils but a charge of dust shot from the .410 so disabled it that the mamba was unable to make off and a charge of No. 8 from the other barrel brought it down.

A native brought in another about the same size. He had been cycling along the road towards our camp when the snake attempted to dash across the track. The boy jammed on his brakes, but the snake was already through his front wheel and, entangled in the spokes, wedged into the front fork. The lad sprang from the machine and ran down the road. On looking back he saw the snake still caught in the forks at which it was striking blindly, cutting a long pole the native returned and belaboured the snake from a safe distance but without damaging it lest its value be depreciated. When stunned, he placed a noose round its neck and brought it alive to camp where it presently recovered (vide plate 4, fig. 2).

DENDRASPIS ANGUSTICEPS (Smith)

Naia angusticeps A. Smith, 1849, Illus. Zoöl. S. Africa, 3, pl. lxx: Natal and the country eastwards towards Delagoa Bay.

Dendraspis sjöstedti Lönnberg, 1907, in Sjöstedt, "Wiss. Ergeb. Schwed. Zoöl. Exped. Kilimandjaro, Meru umgeb. Massaisteppen." No. 4, p. 17, pl. i, f. 2: Kibonoto, Kilimanjaro, Tanganyika Territory.

♂ (M. C. Z. 40749) Kibwezi, K. C. 24.iii.34.

skin (M. C. Z. 40750) Tsavo, K. C. iii.34.

♀ (M. C. Z. 40751) Mt. Mbololo, K. C. 16.iv.34.

♂ ♀ ♀ (M. C. Z. 40752-3) Kitau, Manda Id., K. C. 15-19.v.34.

♂ (M. C. Z. 40754) Near Witu, K. C. 31.v.34.

young (M. C. Z. 40755) Malindi, K. C. 29.vi.34.

Distribution. Also one from Sokoki Forest (H. J. A. T.).

Native names. *Ilumangiu* (Kitaita); *fiha* (Kiamu).

Synonymy. *D. sjöstedti* was based on one of seven mambas taken at Kibonoto, the others being referred to *angusticeps*. It is, as its author thought might be the case, only an aberrant individual whose irregular scalation is due to a fusing of head shields in these very variable reptiles.

Variation. Midbody scale-rows 19-25; ventrals 209-250; anal divided; subcaudals 104-114; labials 7-9, the 4th entering the orbit; preoculars 3; postoculars 3-4, the lowest might be termed a subocular; temporals 2 + 3, 2 + 4 or rarely 2 + 5; temporals along the outer border of a parietal 2-4, being separated from the hindmost on the opposite side by from 3-7 scales.

Measurements. The largest ♀ (M. C. Z. 40752) measures 9 feet, i.e. 2630 (2110 + 520) mm., the tip of the tail being missing.

Diet. One Kitau mamba held a bat (*Lavia f. rex*) and two young thrushes (*Turdus tephronotus*) so freshly swallowed that all three were preserved. See below.

Parasites. Ticks (*Aponomma laeve*) were preserved from Kitau snakes.

Field Notes. As a native youngster and I were creeping through the scrub woodland, our attention occupied with searching the trees for hyrax, a vivid green mamba was suddenly seen by my small guide. He started back, colliding into me; the snake, I fancy, having been lying across the trail we were pursuing. When I first saw it the beautiful reptile was within six feet of us and rapidly ascending a bush to a liana, thence to a tall euphorbia. I let it attain a height of thirty feet before shooting it. It fell at my feet and was dispatched with a stick. Length 5' 8½". (Kibwezi, March 24, 1934).

On arrival at Tsavo, I found the eight-foot skin of a mamba hanging in the cellar of the empty house which I occupied, I learned that it was from a snake which a fortnight before had been shot about fifty feet from the empty building by a prospector who had stayed in the house.

One day, I was standing on a large mass of smooth, but slightly

sloping, rock on a boulder-strewn hill southeast of the station. Below, and to the left of me, was a gunbearer searching for a hyrax which I had just shot. Above, and behind me, a second native was descending after going to retrieve a lizard which I had shot. Apparently, in descending, he disturbed a mamba, possibly six feet in length, certainly not an inch less than five feet. It was so quick in its rush that he never saw it. I felt something bump and brush against my shoe, as I half-turned the snake was already in mid-air having shot off the rock with the impetus of its descent. It landed twenty feet below on a mass of scrub and thorn, never paused, slid straight over another huge slab in full view, then dived into a tangle of vegetation beyond this rock and was seen no more. The boy on the rocks to the left below me, exclaimed: "Did you see that big snake go right between your legs?" As a matter of fact it was not actually between, what happened was that it had side-slipped with the velocity with which it arrived on the rock, then cannoned against my shoe. I was thankful that my back was towards it for had I been facing the other way I should doubtless have gone to swell the ranks of those who thought they had been attacked by a mamba. Though I had a twelve-bore shotgun in my hand there was not time to use it and had there been I should have hesitated to do so with the descending native just twenty feet behind the snake. (Tsavo, April 4, 1934).

An Mtaita brought in a fine specimen measuring eight and a quarter feet, he said that he shot it with an arrow as it was about to enter the door of his hut. Today I was summoned to catch an exceptionally large one that was engaged in swallowing a big species of rat (apparently a cane rat (*Thrynomys* sp.) by their description); the mamba was on a narrow path through dense, impenetrable scrub. They said that this particular snake was well known as it frequented a tree overhanging a waterhole and scared the women coming for water. We passed this waterhole which was about fifty yards from where the snake was supposed to be swallowing the rat. On our arrival we found that it had departed, leaving a track as large as that of a small python; we lost it in the scrub. (Mount Mbololo, April 16, 1934).

The afternoon of our arrival on Manda Island my attention was attracted by two thrushes fluttering about an acacia. It turned out that they were annoyed by a five and a half foot mamba which had swallowed their nestlings. A full account of the incident will be found in the report on the birds collected, (see page 177 of this vol.) under *Turdus tephronotus*. (Kitau, May 15, 1934).

Our part of the island was largely covered by acacia trees whose low, wide-spreading boughs necessitated constant stooping when one followed the few native paths through the dense scrub. These same spreading boughs apparently provided ideal situations on which mambas could sun themselves. Today we were returning to camp along a narrow path through acacia forest and scrub. I, leading by about a hundred feet, stooped and passed beneath a spreading bough, as I had already done a score of times during the morning's tramp.

Next came a native carrying a dikdik in each hand. He also stooped and passed on. The gunbearer followed, a collecting gun in his right hand, a rifle slung across his back and projecting above his left shoulder. A tall fellow, he did not stoop sufficiently, and the muzzle of the rifle became entangled in the branch. Without looking round, he impatiently jerked his left shoulder; failing to free himself, he turned to see how best he could be extricated and found himself looking into the face of a mamba whose "neck" was resting against the rifle barrel and must therefore have been within six inches of his face. With a wild cry, the man sprang forward, freeing the rifle by the impetus of his rush. I came hurrying back, to find the snake already three trees away and travelling fast over foliage at a height of twenty-five feet from the ground. I shot it, and, on recovering the reptile, found it to be a nine-foot female, exclusive of the tip of the tail which was missing — probably lost in her youth. She was in well-nourished condition with quantities of fat though the stomach was clean and empty. (Kitau, May 17, 1934).

As I was running through fairly open scrub in search of a bush-fowl that I had shot, I disturbed a mamba, six feet in length. Apparently it was on the ground but when first seen it was four feet from my face ascending a bush at a great pace, from thence to an acacia without pausing until it attained a height of twenty feet. There I shot it; in its stomach were nestling birds. (Kitau, May 19, 1934).

The point in recounting these incidents is to show that in East Africa, as distinct from further South, mambas do not as a normal thing appear to be aggressive. Though they were evidently very abundant on Manda Island the natives said that they only remembered one of their number being bitten by this species. He inadvertently trod upon it, was bitten, and died; the incident occurred several years before.

VIPERIDAE

CAUSUS RESIMUS (Peters)

Heterophis resimus Peters, 1862, Monatsb. Akad. Wiss. Berlin, p. 277, pl. —, fig. 4: Gebel Ghule, Sennar, Sudan.

Causus Jacksonii Günther, 1888, Ann. Mag. Nat. Hist. (6), 1, p. 331: Lake Tanganyika and Lamu, Kenya Colony.

2 (M. C. Z. 40757–8) Kaimosi, K. C. 25.ii.34.

2 (M. C. Z. 40759–60) Peccatoni, K. C. 24.v.34.

10 (M. C. Z. 40761–70) Ngatana, K. C. 11–20.vi.34.

Native names. *Kiukisi* (Kiamu); *lundugalla* (Kipokomo).

Variation. Midbody scale-rows 19–21; ventrals 137–145; anal entire; subcaudals 16–23; labials 6; subocular 1 or fused with a postocular, the fusion reaches a climax in several snakes where the eye is surrounded by only three scales and the supraocular; preoculars 1–3, normally 2; postoculars 1–3, normally 2; temporals 2 + 3, rarely 2 + 4.

Measurements. The largest ♂ (M. C. Z. 40762) measures 572 (517 + 55) mm., the largest ♀ (M. C. Z. 40764) measures 552 (512 + 40) mm.

Breeding. At Peccatoni on May 24, 1934, a ♀ held 9 eggs measuring 12 x 5 mm., at Ngatana on June 11, 1934, another had 4 eggs measuring 19 x 9 mm., in her oviducts.

Two snakes, taken at Kaimosi on February 25, 1934 and at Ngatana about June 12, 1934, are so small as to give some indication of the breeding season. They measured 176 and 190 mm. respectively.

Diet. At Peccatoni, I had just remarked that it was curious there were no snakes seeking the numerous frogs assembled in swamped grasslands near the lake, when we disturbed a Green Night Adder moving sluggishly along beneath a young doom palm on a little island in the flooded area. Shortly after capture it disgorged two young *Rana m. mascareniensis* while in its stomach was a *Phrynomerus bifasciatus* so recently taken as to be worth preservation, and a second which had probably been swallowed twenty-four hours before, as the head and anterior portion of the body were digested away. In an Ngatana snake were the remains of a toad (*Bufo steindachnerii*).

Parasites. At Ngatana one male had a cestode (*Ophiotaenia* ? *pumicea*), and had a Linguatulid emerging from its nostril while others (*Porocephalus subulifer* and *Railleticella boulengeri*) were removed from its stomach; a second specimen, which like the first was killed in a cyanide jar, had one of these curious creatures emerging from its anus.

CAUSUS DEFILIPPII (Jan)

H(eterodon) De Filippii Jan, 1862, Arch. Zoöl. Anat. Fisio., 2, p. 225: Africa.

♂ ♂ (M. C. Z. 40771-2) Sokoki Forest, K. C. vi.32.

Collected and presented by Mr. H. J. Allen Turner.

Variation. Midbody scale-rows 17; ventrals 112-115; anal entire; subcaudals 16-17 pairs; labials 6; subocular 1; preoculars 2; postoculars 2; temporals 2 + 3 and 2 + 4.

Measurements. The larger ♂ (M. C. Z. 40771) measures 376 (343 + 33) mm.

Parasites. Ticks (*Aponomma ochraceum*) of a rare species were found upon it.

CAUSUS LICHTENSTEINII (Jan)

H(eterodon) Lichtensteinii Jan, 1859, Rev. & Mag. Zoöl., p. 511: Gold Coast.

♂ (M. C. Z. 40756) Kaimosi, K. C. 28.ii.34.

Variation. Midbody scale-rows 15; ventrals 144; anal entire; subcaudals 22; labials 7; subocular 1; preoculars 3; postoculars 2; temporals 2 + 3.

Measurements. ♂ measures 527 (480 + 47) mm.

BITIS ARIETANS (Merrem)

(Plate 5, fig. 1)

Vipera arietans Merrem, 1820, Vers. Syst. Amphib., p. 152: Cape of Good Hope.

♀ (M. C. Z. 40773) Aturai, Karamoja, U. 11.xi.33.

♂ (M. C. Z. 40774) Sipi, U. 22.xii.33.

2 (M. C. Z. 40775) Bukori, K. C. 18.i.34.

♀ (M. C. Z. 40776) Kirui, K. C. 21.i.34.

♀ (M. C. Z. 40777) Elgonyi, K. C. 31.i.34.

2 (M. C. Z. 40778) Kaimosi, K. C. 10.ii.34.

♀ (M. C. Z. 40779) Kibwezi, K. C. 23.iii.34.

♂ (M. C. Z. 40780) Mkonumbi, K. C. 28.v.34.

Native names. *Akipom* (Karamojong); *chikorviri* (Lugishu).

Variation. Midbody scale-rows 27-35; ventrals 132-143; anal entire; subcaudals 16-33; labials 11-15.

Measurements. The largest ♂ (M. C. Z. 40780) measures 1400 (1280 + 120) mm., i.e. 55 inches long, being the biggest ♂ I have seen. Though rather emaciated and its stomach empty, it weighed 6 lbs. on a spring balance.

Breeding. The Aturai ♀ had ova just developing, the Elgonyi snake fifteen or more embryos, the exact number undeterminable from the pounding the snake had received from the native who brought it in. The Kibwezi Puff Adder is so young (213 mm.) as to have been but recently born.

Diet. Rodent fur in the Sipi snake, a House Rat (*Rattus r. kijabius*) in the Kaimosi reptile.

Distribution. Said not to occur on Lamu Island, but the natives on Manda Island say that it is common there and that many cattle die from its bite. The probability is that they die from mamba bites. I saw no Puff Adders during my week on the island though I searched specially for them one afternoon.

BITIS NASICORNIS (Shaw)

(Plate 5, fig. 2)

Coluber Nasicornis Shaw, 1802, Nat. Miscell., 3, pl. xciv: Interior of Africa (from the master of a Guinea vessel).

18 (M. C. Z. 40781-94) Kaimosi, K. C. 8-10.ii.34.

Native name. *Liheri* (Luragoli).

Variation. Midbody scale-rows 33-39; ventrals 119-129; anal single; subcaudals 16-30; labials 15-19.

Measurements. The largest ♂ (M. C. Z. 40783) measures 760 (705 + 55) mm., the largest ♀ (M. C. Z. 40781) measures 1015 (945 + 70) mm.

Sexual dimorphism. Subcaudals in males are 25-30, in females 16-19. Males up to a length of 476 mm. have the belly beautifully marbled and mottled as in all females, adult males, however, have the belly uniformly dirty white in sharp distinction to those of the females. On close examination markings can be vaguely discerned beneath the scales though this has nothing to do with sloughing.

Breeding. Thirty-eight large embryos were present in each of two big females brought in on the 8th of February, 1934.

Diet. Rodent fur was present in most stomachs, the only identifiable mammals were a shrew (*Crocidura n. nyansae*) and a mouse (*Lophuromys a. aquilus*). A toad (*Bufo r. regularis*) in a young viper.

Parasites. One three-quarter grown snake held twenty-five large linguatulids (*Armillifer grandis*) in its intestines, stomach and in the viscera just behind the head. The stomach of the same animal held many small nematodes.

Enemies. Nose-horned vipers were recovered from the stomachs of a civet (*Civettictis c. schwarzii*) and mongoose (*Ichneumia a. ibeana*).

This big viper is so abundant at Kaimosi that eighteen were brought in by natives in three days, after which I refused to purchase more so that no deduction can be made as to its abundance from the number brought back. I feel confident that I could have obtained a hundred during the month we were at Kaimosi.

ATHERIS SQUAMIGERA (Hallowell)

Echis squamigera Hallowell, 1854, Proc. Acad. Nat. Sci. Philad., p. 193: Near the Gaboon River, Guinea, French West Africa.

♀ (M. C. Z. 40795) Sipi, U. 18.xii.33.

49 (M. C. Z. 40796-841) Kaimosi, K. C. 10-28.ii.34.

Native name. *Kisigosog* (Lugishu).

Variation. Midbody scale-rows 19-23, average 20; ventrals 148-161, average 153; anal entire; subcaudals 40-59, average 50; labials 8-12 though only four sides have 11 and one 12, average 9.

Measurements. The largest ♂ (M. C. Z. 40841) measures 595 (492 + 103) mm., the largest ♀ (M. C. Z. 40795) measures 701 (590 + 111) mm.

Sex. Apart from the fact that adult females attain a larger size than adult males while the latter have tails proportionately longer on the average, the sexes cannot be distinguished either by their ventral or their subcaudal scale counts.

Breeding. The ♀ from Sipi, killed December 18, 1933, was bloated with very small embryos but so damaged as to be uncountable. None of the Kaimosi series was gravid.

Diet. A tree mouse (*Dendromus i. insignis*), a mouse (*Mastomys c. tinctus*) in another while two held pigmy mice (*Leggada g. grata*). Unidentifiable rodent fur and a tree frog (*Hyperolius rossii*) completed the list for forty-four stomachs were empty!

ATRACTASPIIS BIBRONII Smith

Atractaspis bibronii A. Smith, 1849, Illus. Zoöl. S. Africa, Rept. pl. lxxi: Eastern districts of Cape Colony, South Africa.

Atractaspis rostrata Günther, 1868, Ann. Mag. Nat. Hist. (4), 1, p. 429, pl. xix, fig. 1: Zanzabar.

3 (M. C. Z. 40842-4) Ngatana, K. C. 13-19.vi.34.

2 ♂ (M. C. Z. 40845-6) Changamwe, K. C. 4.vii.34.

Native name. *Ume* (Kipokomo).

Variation. Midbody scale-rows 23; ventrals 245-258; anal entire; subcaudals 21-25; labials 5, the 3rd and 4th entering the orbit; lower labials in contact with an anterior chin shield 3; preocular 1; postocular 1; loreal 0; temporals 1 + 2.

Measurements. The larger ♂ (M. C. Z. 40845) measures 448 (422 + 26) mm., the largest ♀ (M. C. Z. 40842) measures 549 (519 + 30) mm.

Diet. A skink (*Riopa sundevallii*) was in the stomach of one of the burrowing vipers from Changamwe.

Habitat. I took the Changamwe snakes beneath a pile of rotting palm fronds and the palm thatch of a collapsed hut close to the station.

ATRACTASPIS MICROLEPIDOTA Günther

Atractaspis microlepidota Günther, 1866, Ann. Mag. Nat. Hist, (3), 18, p. 29, pl. vii, fig. 3: Type locality unknown. "Probably West Africa." *errore*.

3 ♀ (M. C. Z. 40847-9) Voi, K. C. 10.iv.34.

Variation. Midbody scale-rows 32; ventrals 239-252; anal entire; subcaudals 27-34 (one had the first 23 subcaudals single, then 8 paired followed by the last 3 single); labials 6-7, the 4th entering the orbit; lower labials in contact with an anterior chin shield 3; preocular 1; postocular 1; loreal 0; temporals 2 + 4 and 3 + 4.

Measurements. The largest ♀ (M. C. Z. 40847) measures 770 (705 + 65) mm.

Habitat. Both the adult females were taken together under the rotting grass roof of a collapsed native hut about a mile southeast of the station. In the same spot was a large female boa (*Eryx c. loveridgii*) while among the debris of another hut fifty feet away was another boa and a young House Snake (*Boaedon lineatus*). Though taken at the end of a long dry season and the stomachs of all these snakes were empty, they possessed considerable deposits of fat.

GEKKONIDAE

CNEMASPIS AFRICANUS AFRICANUS (Werner)

Gymnodactylus africanus Werner, 1895, Verh. zool.-bot. Ges. Wien, 45, p. 190, pl. v, f. 5: Usambara Mountains, Tanganyika Territory.

2 ♂ 1 ♀ (M. C. Z. 40877-9) Mt. Mbololo, K. C. 22.iv.34:

Variation. Upper labials 6-8; lower labials 6-8; preanal pores 10, one male has an additional, supernumerary pore anterior to the usual row; back and base of tail with 10-14 irregular rows of enlarged tubercles.

Measurements. The larger ♂ has the same head and body length as the ♀, but his tail is damaged; ♀ measures 91 (50 + 41) mm.

Breeding. This female was gravid, the ova being about half the diameter of an egg when laid.

Diet. A cockroach and remains of small beetles.

Habitat. Found in the remnant of rain forest capping the mountain at 4,800 feet. I observed one of these geckos slip beneath loose bark on the trunk of a huge tree at a height of six feet from the ground; by stripping the bark we secured this specimen and two others. Extensive search in the forest failed to produce any more.

CNEMASPIS AFRICANUS ELGONENSIS Loveridge

(Plate 6, fig. 1)

Cnemaspis africanus elgonensis Loveridge, 1936 (1935), Proc. Zoöl. Soc. London, p 820: Above Sipi at 6,500 feet, Mount Elgon, Uganda.

♂ (M. C. Z. 40870) Nyenye, Mt. Elgon, U. 8.xii.33.

2 ♂ 2 ♀ & eggs (M. C. Z. 40871-5) Sipi, Mt. Elgon, U. 12-14.xii.33.

♂ (M. C. Z. 40876) Kaimosi, Kakamega, K. C. 24.ii.34.

Distribution. Eggs of this race were also found on Mount Debasien at 5,000 feet; a gecko was seen at Buluganya, 6,024 feet, on the western slopes of Mount Elgon.

These Elgon geckos represent the type series of a central African form as distinct from the typical form inhabiting the montane forests of eastern Africa.

Native names. *Kibaraqwesi* (Kisabei and Lugishu, but not specific). Called *lisiamogoma* by the Maragoli of Kaimosi who believe it to be the young of *Agama atricollis*, to which lizard this name more properly belongs.

Variation. Upper labials 5-7, average 6.1; lower labials 5-7, average 6; preanal pores 6-8; back and base (only) of tail with 10-14 irregular rows of enlarged tubercles.

Coloration. Varying with environment, pale olive on the olive bark of a wild fig tree at Nyenye.

Adult ♀ type at Sipi. Above, gray- or brown-olive, lighter on crown and with a pale, interrupted, vertebral line. Below, soiled white flecked with brown, regenerated portion of tail plumbeous.

Newly-hatched young are faintly yellowish from neck to anus, tail pink below. Half-grown young are bright mustard yellow from chin to anus and this may even extend on to the base of the tail, remainder of tail being gray.

Measurements. Largest ♂ (M. C. Z. 40872) measures 109 (52 + 57) mm.; largest ♀ (M. C. Z. 40873) measures 112 (56 + 56) mm., but is shorter by 5 mm. in length from snout to anus than another with a regenerated tail. Newly-hatched young measure 40 (19 + 21) mm.

Breeding. On November 22, I found two fresh eggs of this species beneath a log on cleared land on Mount Debasien at 4,500 feet. No geckos were seen, however, and unfortunately these eggs broke in the laboratory while being measured.

On December 12, a gravid ♀ with fully developed eggs was taken at Sipi; on the 14th many eggs, measuring from 10 x 10 to 11 x 9 mm., mostly holding embryos, were found; some of the young hatched out during the following week.

Diet. Three crickets in Sipi geckos examined.

Enemies. One ♂ (M. C. Z. 40871) was recovered from the stomach of a green snake (*Chlorophis hoplogaster*).

Habitat. The Kaimosi gecko was found in a bucket into which it had fallen and from which it could not escape. Another was seen on the door of a garage at the mission, showing a certain amount of adaptability in this sylvicoline species.

CNEMASPIS QUATTUORSERIATUS (Sternfeld)

Gonatodes quattuorseriatus Sternfeld, 1912, Wiss. Ergebn. Deutsch-Zentral-Afrika-Exped. 1907-08, 4, p. 202, pl. vi, f. 1: Kissenje; Lake Kivu; Uvira, etc., Belgian Ruanda.

5 ♂ 9 ♀ (M. C. Z. 40850-9) Mt. Debasien, U. 14-22.xi.33.

9 ♂ 8 ♀ (M. C. Z. 40860-9) Sipi, Mt. Elgon, U. 12-14.xii.33.

Distribution. These records constitute the first for the occurrence of this species in Uganda, it has already been recorded from Kenya (Nieden) and Tanganyika (Loveridge).

Native name. *Kibaragwesi* (Kisabei and Lugishu, but not specific as applied to the larger species which also occurs on Mount Elgon).

Variation. Upper labials 5-7, average for sixty-two sides 5.7, only six sides have 7; lower labials 4-6, average 5.5, only one side has 4; preanal pores 8 in all fourteen males; back, except posteriorly, devoid of enlarged tubercles, a dorso-lateral and a lateral series of tubercles

not quite so developed as in a cotype of *quattuorsciatus*, occupying an intermediate position between that species and *dickersoni* of the Ituri.

Measurements. The largest ♂ in both localities measure 83 mm., viz. (41 + 42 and 37 + 46) mm. respectively; the largest ♀ (M. C. Z. 40854) measures 79 (38 + 41) mm., but in length from snout to anus is 3 mm. shorter than another with regenerating tail.

Breeding. On November 18, a pair of eggs, measuring 7 x 6 mm., were taken together with a pair of geckos in a rotting log in the dry rain forest at 8,000 feet. On the 21st, another pair of eggs were found among drifted leaves at 4,000 feet; they were broken open and found to be fresh.

Diet. Remains of very small spiders, beetles and ants were recovered from four stomachs examined.

Habitat. On Debasien these geckos occur in the gallery forest of the ravines from 4,000 feet up to the rain forest at 8,000 feet. Several were taken in drifts of leaves lying between the buttress roots of the giant *mvuli* trees, more frequently in rotting logs and in one case beneath a stone in the dry river bed. Several were taken on tree trunks in camp and after sunset one was caught running across a clearing in gallery forest.

HEMIDACTYLUS BROOKII Gray

Hemidactylus brookii Gray, 1844, Zoöl. in Voyage of Erebus and Terror, pl. xv, fig. 2: "Australia; Borneo." (*errore*)

♂ (M. C. Z. 40915) Butandiga, U. 8.i.34.

♂ & yng. (M. C. Z. 40916-7) Tsavo, K. C. 30.iii.34.

♂ ♀ (M. C. Z. 40918-9) Voi, K. C. 7.iv.34.

♂ ♀ (M. C. Z. 40920-1) Kitau, Manda Id., K. C. 16.v.34.

Distribution. Also one from Sokoki Forest (M.J.A.T.).

Variation. Upper labials 6-8, average of eighteen sides 7.5, only one side has 6; lower labials 5-8, average 7.4, only one side has 5; preano-femoral pores 26-46.

Coloration. The Voi female was a very beautiful red as were the three young from Tsavo, this tendency to retain and accentuate the juvenile coloring is probably correlated with the red volcanic soil of the Tsavo-Voi region.

Measurements. The largest ♂ (M. C. Z. 40916) measures 137 (67 + 70) mm., the largest ♀ (M. C. Z. 40918) measures 120 (65 + 55) mm. but the forked tail is in process of regeneration.

Habitat. I personally took all the Kenya specimens in houses or the ruins (Kitau) of a house. The Butandiga gecko was brought in by

a native who possibly took it lower down Mount Elgon than Butandiga, which is 7,010 feet.

HEMIDACTYLUS MANDANUS Loveridge

Hemidactylus mandanus Loveridge, 1936, Proc. Biol. Soc. Washington, 49, p. 60: Kitau, Manda Island, Kenya Colony.

♀ (M. C. Z. 39995) Kitau, Manda Id., K. C. 15.v.34.

Remarks. This is the holotype of the species.

HEMIDACTYLUS MABOUIA (Moreau de Jonnés)

Gecko mabouia Moreau de Jonnés, 1818, Bull. Soc. Philom. Paris, p. 138: Antilles and adjacent mainland.

- 6 ♂ 4 ♀ (M. C. Z. 40880-4) Kibwezi, K. C. 23-24.iii.34.
- ♀ (M. C. Z. 40885) Near station, Tsavo, K. C. 2.iv.34.
- 2 ♂ 2 ♀ (M. C. Z. 40886-7) Voi, K. C. 10.iv.34.
- 2 ♂ 4 ♀ (M. C. Z. 40888-9) Mt. Mbololo, K. C. 19.iv.34.
- 4 ♂ 2 ♀ (M. C. Z. 40890-3) Golbanti, K. C. 2-3.v.34.
- ♀ (M. C. Z. 40894) Lamu, Lamu Id., K. C. 5.v.34.
- ♀ & eggs (M. C. Z. 40895) Kitau, Manda Id., K. C. 15.v.34.
- ♀ (M. C. Z. 40896) Witu, K. C. 30.v.34.
- ♀ (M. C. Z. 40897) Belazoni, K. C. 6.vi.34.
- 3 ♂ 1 ♀ (M. C. Z. 40898-9) Ngatana, K. C. 11.vi.34.
- ♀ & yng. (M. C. Z. 40900-1) Malindi, K. C. 29.vi.34.
- 2 ♀ (M. C. Z. 40902) Mombasa, K. C. 5-6.vii.34.

Native names. *Molukandua* (Kitaita); *ndikafiri* (Kiamu); *goria* (Kipokomo).

Variation. Preanal pores in seventeen males range from 32-52, average 41. The female from Lamu Island, while undoubtedly *mabouia* in size and scalation, is one of those exceptional individuals which in having 5 (instead of 7-9) pairs of subdigital lamellae under the median digit, agrees with *persimilis* which occurs in the same locality.

Breeding. On May 15, a pair of eggs were collected from the bark of a baobab tree on Manda Island.

Dict. On June 24, at Golbanti on the Tana River, I was seated at breakfast on the verandah of the rest house, when my attention was attracted by a slight commotion among the rafters supporting the grass thatch. A *H. mabouia* had seized a small gecko (*Lygodactylus p. mombasicus*) and was holding the head of the latter in its jaws. The prey was an adult male which twirled its body round and round in a vain attempt to free itself.

HEMIDACTYLUS PERSIMILIS Barbour & Loveridge

Hemidactylus persimilis Barbour & Loveridge, 1928, Mem. Mus. Comp. Zool., **50**, p. 140, pl. iv, figs. 1 and 3: Dar es Salaam, Tanganyika Territory.

7 young (M. C. Z. 40903-4) Lamu, Lamu Id., K. C. 7.v.34.

3 young (M. C. Z. 41922-3) Mombasa Id., K. C. 5.vii.34.

HEMIDACTYLUS FRENATUS Duméril & Bibron

Hemidactylus frenatus Duméril & Bibron, 1836, Erpet. Gén., **3**, p. 366: South Africa, etc.

11 young & eggs (M. C. Z. 40905-6 Lamu, Lamu Id., K. C. 10-14.v.34.

HEMIDACTYLUS WERNERI WERNERI Tornier

Hemidactylus werneri Tornier, 1897, Arch. Naturg., **63**, p. 63: Dalalani, Tanganyika Territory.

7 ♂ 5 ♀ & eggs (M. C. Z. 40908-14) Voi, K. C. 9.iv.34.

♀ (M. C. Z. 40000) Ngatana, K. C. 18.vi.34.

Native name. *Goria* (Kipokomo, but not specific).

Variation. Upper labials 6-8; lower labials 5-6; preanal pores 10-20 in six males, 6 in two geckos which are possibly of either sex and very young.

Though the majority of these geckos come from a locality not much more than twenty miles from Bura, type locality of *H. w. alluaudi* Angel, not one of them has the mental separating the chin shields which is the sole characteristic of that race. I am inclined to think that *alluaudi* may have been founded on an aberrant individual.

Coloration in life. Adult ♀ Ngatana. Above, olive variegated with flecks of black and white, the white chiefly on enlarged keeled scales and uniformly arranged in four longitudinal series; edges of digits flecked with chinese white. Below uniform white. Pupil vertically elliptic, black flanked by gold.

Measurements. None of the series is fully grown, they range in size from 43 (23 + 20) mm. to 78 (40 + 38) mm.

Breeding. On April 9, four pairs of detached gecko eggs, from 8 x 8.5 to 9 x 9.5 mm. were found in association with these young geckos in a spot where no other species of geckos were encountered.

Habitat. The whole of the Voi series were taken in a single morning

of intensive search among the crumbling ruins and collapsed thatching of some mud huts on the Msinga Estate, a few miles from Voi. The absence of adults, which are known to live in the burrows of insects or termitaria, leads one to assume that the adults had only resorted to this spot to deposit their eggs.

HEMIDACTYLUS TROPIDOLEPIS SQUAMULATUS Tornier

Hemidactylus squamulatus Tornier, 1897, Die Kriechthiere D-O-Afrikas p. 10: Kakoma, Ugundu, Tanganyika Territory.

♀ (M. C. Z. 40907) Changamwe, K. C. 4.vii.34.

Distribution. Also 2 from Sokoki Forest (H.J.A.T.).

Measurements. Total length 84 (44 + 40) mm.

Habitat. This big example of a rare species was taken beneath a pile of rubbish in a native garden and not more than a couple of miles distant from where the male was taken in 1929 (Loveridge, 1933, p. 284).

BUNOCNEMIS MODESTUS Günther

Bunocnemis modestus Günther, 1894, Proc. Zool. Soc. London, p. 95, pl. viii: Ngatana, Tana River, Kenya Colony.

1 ♂ 3 ♀ (M. C. Z. 39996-9) Ngatana, K. C. 12-18.vi.34.

Native name. *Goria* (Kipokomo, but applied to *Hemidactylus* spp. also).

Affinities. It is somewhat problematical as to whether this small gecko should be generically separated from *Hemidactylus*. It is so closely related to the members of the *H. squamulatus* group, which have imbricate scales on the dorsum and scarcely dilated digits, that the only character of generic significance remaining is the undivided subdigital lamellae.

Unfortunately in the young, many of the subdigital lamellae are so deeply grooved that without very close scrutiny it is extremely difficult to say whether they are paired or single. It will be recalled that Tornier has described a second species, which he referred to this genus, and states that some lamellae are single, some paired, on each digit. The fact that this second species, *matschiei* comes from Togoland raises doubts as to whether these two geckos have not arisen separately from *Hemidactylus*, on the other hand it is true that the fauna of Tanaland has distinct West African affinities. *B. matschiei*

appears to bridge the slight gap between Hemidactylus and Bunocnemis, but until direct comparison can be made the point had better be left unsettled.

Variation. Upper labials 6-8; lower labials 5-7; preanal pores 14. Considerable variation is displayed in the number of the subdigital lamellae owing to the gradual diminution in size so that it is often hard to decide as to whether some of those at the base of the digits should be considered lamellae or only transversely-dilated scales; generally it may be said that there are from 6 to 8 under the fingers and longer toes, from 3 (Günther) or 4 to 6 under the inner and outermost toes.

Measurements. The only ♂ (M. C. Z. 39996) measures 73 (45 + 28) mm., but the tip of the tail is undoubtedly reproduced, the largest of the females with a perfect tail, measures 56 (29 + 27) mm., so that we are justified in assuming that normally an uninjured tail should almost equal the length of the head and body.

Diet. Two of the stomachs were empty, the other two contained the abdomen of an isopod (I am indebted to Mr. N. Banks for the identification) and a number of eggs, apparently those of a small species of grasshopper.

Enemies. The hind foot and tail of one female had been lost long ago, the wounds healed.

Habitat. Few reptiles gave me more trouble to secure than did this topotypic series of a gecko known only from the type. I had planned to spend one week at Ngatana but two elapsed before a native brought in the first example of the lizard for which I had been out hunting daily. Describing to me where he had found it, enabled me to catch three more during the following week. These geckos were found in the piles of rubbish and rotting vegetation which had been cleared from the native gardens, situated among the mango trees which mark the site of the vanished village of Ngatana. Their habitat, therefore, is exactly similar to that of *H. squamulatus*.

LYGODACTYLUS FISCHERI SCHEFFLERI Sternfeld

Lygodactylus fischeri scheffleri Sternfeld, 1912, Wiss. Ergeb. der Deut. Zentral-Afrika-Exped. 1907-1908, 4, p. 206: Kibwezi, Kenya Colony.

♂ (M. C. Z. 40994) Voi, K. C. 10.vi.34.

Variation. Upper labials 6-7; lower labials 6-5; supranasals in contact; preanal pores 6; regenerated tail with a single row of transversely enlarged subcaudals.

Coloration. Unfortunately the coloration in life of this handsome little gecko was not recorded; it lacks the jet black patch in front of the fore legs mentioned by Sternfeld; it has six, instead of two, black vertical blotches between the fore and hind limbs, they increase in intensity posteriorly; the faint reddish gray band from neck to root of tail is just discernible.

Measurements. Total length 44 (24 + 20) mm., but tail regenerating; the male type was 51 (24 + 27) mm.

Habitat. Voi is about eighty miles southeast of the type locality. I first caught sight of this specimen as it ran up the trunk of a mango-like tree, which had laurel-like leaves, in fairly dense gallery forest beside the (dry) Voi River. The gecko disappeared beneath a sliver of bark at a height of twenty feet, by throwing up a stick I dislodged the sliver which, together with the gecko, fell to the ground. The reptile dashed up the trunk again and beneath another piece of loose bark where I was able to catch it.

LYGODACTYLUS PICTURATUS PICTURATUS (Peters)

Hemidactylus picturatus Peters, 1870, Monatsb. Akad. Wiss. Berlin, p. 115: Zanzibar.

5 (M. C. Z. 40940-4) Voi, K. C. 10-11.iv.34.

Variation. These are somewhat of intermediates between the typical race and *L. p. mombasicus* but had the mustard-yellow heads of true *picturatus*. They were taken on big trees along the bed of the Voi River where the extreme southeasterly type of *mombasicus* also occurs, the type which is characterized by two well-defined and very distinct dorsolateral bands lying on either side of the vertebral line from neck to root of tail.

LYGODACTYLUS PICTURATUS MOMBASICUS Loveridge

Lygodactylus picturatus mombasicus Loveridge, 1935, Proc. Biol. Soc. Washington, 48, p. 198: Kilindini, Mombasa Island, Kenya Colony.

32 (M. C. Z. 40924-39) Kibwezi, K. C. 23.iii.34.

5 (M. C. Z. 40945-6) Voi River, K. C. 10-11.iv.34.

1 and eggs (M. C. Z. 40947) Mt. Mbololo, K. C. 16-25.iv.34.

2 and eggs (M. C. Z. 40948-9) Lamu, Lamu Id., K. C. 8.v.34.

1 (M. C. Z. 40950) Kitau, Manda Id., K. C. 16.v.34.

5 (M. C. Z. 40951-3) Witu, K. C. 31.v.34.

29 (M. C. Z. 40954-75) Ngatana, K. C. vi.34.

3 (M. C. Z. 40976-8) Golbanti, K. C. 22.vi.34.

2 (M. C. Z. 40979-90) Kilindini, K. C. 5.vii.34.

Distribution. Also 2 from Sokoki Forest (H.J.A.T.).

Native name. *Mvuri* (Kipokomo, but not generic. It is interesting to note that this name is applied to the caecilian in Kikami).

Variation. As this has been covered in the description of this pattern race of *picturatus*, it need not be repeated here.

Breeding. On April 16 and 17, 1934, twenty-eight eggs, measuring circa 8 x 9 mm., were found under rocks lying against a fallen log at the very edge of the rain forest on Mbololo at 4,000 feet. As they were alive they were mailed to the zoölogical gardens but failed to hatch. On May 8, four pairs of eggs, measuring 8 x 9.5 mm., were collected on Lamu Island, a newly hatched young one appeared in my tent and remained till camp was struck. It measured 23 (12 + 11) mm. On May 31, many eggs were seen attached to verandah posts at Witu. About June 8, a pair of eggs, measuring 9.5 x 9.5 mm., and a young gecko measuring 29 (15 + 14) mm., were taken at Ngatana.

Enemies. An account of how one of these small geckos was being attacked by a larger species will be found under *Hemidactylus mabouia*. At Kibwezi and on Mount Mbololo, three of these geckos were recovered from the stomachs of two Spotted Wood Snakes (*Philothamnus s. semicarinatus*), at Voi from a young House Snake (*Boaedon lineatus*).

Habitat. At Kibwezi on the boles of the numerous baobabs; at Voi on the wild fig trees which fringed the river bed; common on the she-oaks along the front at Lamu; a male was taken on an acacia growing right on the seashore at Kitau; I captured the Witu series on the walls of a hut—an unusual situations for geckos of this genus.

LYGODACTYLUS PICTURATUS GUTTURALIS (Bocage)

Hemidactylus gutturalis Bocage, 1873, Journ. Sci. Lisboa, p. 211: Bissao, Portuguese Guinea.

11 (M. C. Z. 40981-7) Mt. Debasien, U. 15-30.xi.33.

2 (M. C. Z. 40988-9) Nabagut, U. 7.xii.33.

4 (M. C. Z. 40990-3) Nyenye, U. 8.xii.33.

Distribution. Specimens were also collected on the march at Lobo-rokojo and Kananyait, between Mts. Debasien and Elgon, but decomposed in the heat before they could be preserved.

Native names. *Ageragera* (Karamojong); *kibaragwesi* (Kisabei).

Variation. Upper labials 6-8; lower labials 5-7; nostril between the first upper labial and 3 (rarely 2) nasals, frequently separated from the lower postnasal by a narrow rim resulting from an upward prolonga-

tion of the first labial; supranasals separated by 1-2 granules in the ratio of 10 to 7; mental followed by 2-3 postmentals in the ratio of 13 to 4, preanal pores 6-8, average 7.3 for nine males.

Measurements. The largest ♂ (M. C. Z. 40987) measures 89 (41 + 48) mm.; the largest ♀ (M. C. Z. 40981) measures 71 (37 + 34) mm.

Breeding. On December 7 and 8, 1933, eggs were found in the decayed interiors of trees at Nabagut and Nyenye respectively.

Enemies. One gecko was recovered from the stomach of a Spotted Wood Snake (*Philothamus s. semivariegatus*) in forest at the foot of Mount Debasien.

AGAMIDAE

AGAMA RUEPPELLI SEPTENTRIONALIS Parker

Agama rueppelli septentrionalis Parker, 1932, Journ. Linn. Soc. London, Zool., **38**, p. 225: Mount Nyero; Madago's village; Voi and Mbunyi, Kenya Colony.

3 ♂ 3 ♀ (M. C. Z. 41003-8) Voi, K. C. 17.iv.34.

Distribution. In 1932, Parker (l.c. pp. 354-5) studied the agamas of this group and came to the conclusion that *vaillanti* Boulenger is a synonym of typical *rueppelli* while for the form inhabiting central and southern Kenya, he proposed the name of *septentrionalis*.

Variation. Scales on the vertebral line 30-33; dorsal scales in an oblique series of the standard length (tip of snout to ear) 11-13.

Measurements. The largest ♀ (M. C. Z. 41003) measures 148 (90 + 58) mm.

Breeding. This female held nine eggs measuring from 17 x 10 mm. to 18 x 9 mm.

Diet. An acridian; stinging ants; head of a fossorial hymenopteran; wings and abdomens of hymenoptera; head and elytra of a beetle.

Habitat. Not uncommon on the stunted thorn trees a few miles outside Voi township.

AGAMA AGAMA AGAMA (Linnaeus)

Lacerta agama Linnaeus, 1758, Syst. Nat., ed. 10, **1**, p. 207: "America."

Agama colonorum Daudin, 1830, Hist. Nat. Rept., **3**, p. 356: "l'Amérique meridionale," etc.

♂ juv. (M. C. Z. 40135) w. Mt. Debasien, U. 24.xi.33.

4 ♂ 8 ♀ (M. C. Z. 40125-34) near Budadiri, U. 8.i.34.

Distribution. The series of twelve were brought up from the western foothills of Mount Elgon to my camp at Butandiga. I am by no means certain whether the Uganda form may not be subspecifically distinct from the typical race which is supposed to have come from the west coast.

Native name. *Ekihobo* (Karamojong).

Variation. Midbody scale-rows 74-84; dorsal scales in a standard length 17-24; preanal pores 8-11.

Coloration in life. ♂. Above, head, neck and a wedge-shaped patch from nape to middle of back, vermilion with a few small yellow flecks on occipital region; limbs, back, base and tip of tail, a dark, bluish-black, the median portion of tail bright vermilion. Below, throat and neck rich vermilion flecked with white and gray in such a way as to produce the effect of silver spotting; limbs (except palms and soles), chest, flanks and end of tail bluish-black but not so dark as on the back.

♀. Above, sooty black, apple-green markings on anterior part of head becoming paler on occiput; a longitudinal streak on either flank from opposite the axilla to midbody is cream colored anteriorly shading to, or tipped with, vermilion posteriorly, after an interspace followed by a blotch of vermilion; median vertebral line a lighter greenish white anteriorly, grayish posteriorly; flecks of gray between it and the lateral streaks and also on the limbs. Below, throat white with gray-black vermiculations; chest and belly white, anteriorly and laterally flecked with gray; limbs dirty white flecked with gray; tail white.

♂ juv. (M. C. Z. 40135). A dusky blue patch on base of throat followed by red.

Measurements. The largest ♂ (M. C. Z. 40131) measures 298 + (128 + 170 +) mm., tail tip lacking; the largest ♀ (M. C. Z. 40126) measures 250 (100 + 150) mm.

Breeding. No development is shown in the ovules of the four adult females.

Parasites. Acarine mites under the scales of M. C. Z. 40129., nematodes in M. C. Z. 40132, the only one of eight examined found to be infected.

Habitat. I shot the young male from Mount Debasien on a miombo tree in long grass at an altitude of about 4,000 feet.

AGAMA AGAMA ELGONIS Lönnberg

(Plate 6, fig. 2)

Agama elgonis Lönnberg, 1921, Arkiv. för Zoöl., 14, No. 12, p. 2: Mount Elgon, Kenya Colony.

Agama agama turuensis Loveridge, 1932, Bull. Mus. Comp. Zoöl., **72**, p. 376: Unyanganyi, Turu, Tanganyika Territory.

- 7 ♂ 1 ♀ (M. C. Z. 41009-15) Sipi, U. 14-22.xii.33.
 5 ♂ 2 yng (M. C. Z. 41017-23) Lukungu, U. 8.i.34.
 10 ♂ 8 ♀ (M. C. Z. 41024-33) Elgonyi, K. C. 20-31.i.34.

Distribution. All these localities are on Mount Elgon; the series was collected with a view to ascertaining whether the range of variation on *Elgon* would be found to include *turuensis* as I suggested (Loveridge, 1933, p. 299) it might. This was found to be the case.

Native names. *Karingis* (Kisabei); *gimbiri* (Lugishu); *bakladut* (Kimasai).

Variation. Midbody scale-rows 74-90; preanal pores 10-16, average for twenty-two males 13.3. It is true that the sixty types of *turuensis* average fewer midbody scale-rows, ranging from 72-82, and the average of preanal pores for thirty-four males is less, viz. 11.3, but the overlap is too considerable to make *turuensis* worthy of recognition in view of the fact that the gular pattern and colour is the same in both *elgonis* and *turuensis*.

Measurements. The largest ♂ (M. C. Z. 41025) measures 318 (135 + 183) mm., parallelling in dimensions the largest in the series of *turuensis*.

AGAMA AGAMA LIONOTUS Boulenger

Agama lionotus Boulenger, 1896, Proc. Zoöl. Soc. London, p. 214, pl. viii: southeast of Lake Rudolph, Kenya Colony.

- 1 ♂ 2 ♀ (M. C. Z. 41034-6) Kacheliba, U. 8.xi.33.
 9 ♂ 6 ♀ (M. C. Z. 41037-50) Kibwezi, K. C. 23-29.iii.34.
 5 ♂ (M. C. Z. 41051-5) Tsavo, K. C. 30.iii.34.
 10 ♂ 4 ♀ (M. C. Z. 41056-9) Voi, K. C. 9-13.iv.34.
 11 ♂ 1 ♀ (M. C. Z. 41060-6) Mt. Mbololo, K. C. 16-28.iv.34.

Distribution. Young ones seen among the rocks in the bed of the Karita River, Uganda.

Native names. *Ekibobo* (Karamojong); *mandari* for adults, *mitarongo* for young (Kitaita).

Variation. Midbody scale-rows 70-84; preanal pores 11-16, average for thirty-six males 13.1.

Coloration. Top of the head mustard yellow, throat red, noted of the Kacheliba male; this is the normal colouring of the head in this race.

Measurements. The largest ♂ (M. C. Z. 41060) measures 340+ (135 + 205+) mm.; the largest ♀ (M. C. Z. 41049) measures 255+ (110 + 145+) mm., the tips of the tails being lacking in both specimens.

Breeding. The three adult females from Kibwezi were all gravid, holding 10, 10 and 12 eggs which measured 15 x 10 mm., 17 x 11 mm., and 20 x 14 mm. respectively. One of the Voi females held 9 eggs measuring approximately 19 x 12 mm.

No deductions should be made as to the relative preponderance of males in the material listed above. Females appear to be more abundant and are certainly easier to collect, a special effort was made to obtain males only.

Dict. Vast numbers of ants, a few beetles, one hemipteron and a caterpillar were present in the stomachs examined; no vegetable matter was noticed.

Parasites. Nematodes (*Strongylurus brevicaudata* and *Saurositus agamae*) were present in some of the Kibwezi and Voi series.

Habitat. In the vicinity of old buildings at Tsavo it was noticed that the young were mostly on the walls of the ruins, the adults chiefly on trees and rocks.

AGAMA PLANICEPS CAUDOSPINOSA Meek

Agama caudospinosa Meek, 1910, Field Mus. Nat. Hist. Zoöl. Series, 7, p. 407: Lake Elementeita, Kenya Colony.

Agama agama kaimosae Loveridge, 1935, Bull. Mus. Comp. Zoöl., 79, p. 10: Near Kaimosi, Kakamega, Kenya Colony.

8 ♂ 11 ♀ (M. C. Z. 40136-50) Near Kaimosi, K. C. 2-9.iii.34.

Native name. *Lisiamogoma* (Luragoli, but generic).

Synonymy. At the time I described *kaimosae*, I regarded both it and *caudospinosa* as races of *A. a. agama*. In view of the fact that both *A. a. lionotus* and *caudospinosa* occur in the same localities in several areas of Kenya, it seems advisable to treat the forms with depressed bodies as races of *planiceps* rather than of *agama*.

Nearly twenty years elapsed between the time I collected any *caudospinosa* and the series of *kaimosae*. My impression of the former was that they were yellow in life in marked contrast to the gorgeous coloring of *kaimosae*. However that may be, after two years in alcohol, the coloring of *kaimosae* is rapidly approaching that of a cotype of *caudospinosa*. Other races of *agama* which I have described do not

depend on fugitive coloring but on characteristic sexual markings which remain (*vide* Loveridge, 1933, Plate 2).

The other alleged distinguishing character which I cited, that of a markedly less developed spinosity of the tail, on reëxamination I now believe to be the result of abrasion in the whole series of *kaimosae*, which were taken among rocks into whose fissures they fled when disturbed. *A. a. kaimosae* is relegated to the synonymy.

Diet. Large numbers of termites and ants, a few beetles and a considerable amount of vegetable matter.

Parasites. The digestive tracts of these lizards teem with nematodes (*Strongylurus brevicaudatus* and *Physaloptera* sp.)

Folklore. The Watereki have a wonderful saying that if one is bitten by an agama, the site of the bite will cause recurring pain during the rainy season or whenever the bitten person hears thunder!

AGAMA ATRICOLLIS Smith

Agama atricollis Smith, 1849, Illus. Zoöl. S. Africa, **3**, Appendix, p. 14: Natal South Africa.

Agama gregorii Günther, 1894, Proc. Zoöl. Soc. London, p. 86: Mkonumbi, Kenya Colony.

14 ♂ 6 ♀ 6 yng. (M. C. Z. 41067-79) Bukori, K. C. 18-19.i.34.

♂ (M. C. Z. 41080) Elgonyi, K. C. 25.i.34.

5 ♂ 4 ♀ (M. C. Z. 41081-9) Kirui's, K. C. 6-7.ii.34.

4 ♂ 4 ♀ (M. C. Z. 41090-5) Kaimosi, K. C. 10-15.ii.34.

3 ♂ 2 ♀ (M. C. Z. 41096-100) Lamu Id., K. C. 7.v.34.

Distribution. I had forgotten that Mkonumbi was the type locality of the synonym *gregorii* or I should have secured topotypes during my short stay there, the Lamu specimens are, however, almost topotypic. Günther's species was based on a single adult male which he compared with *cyanogaster* of Ethiopia, it does not seem possible to separate East from South African examples even subspecifically.

Native names. *Kockamonda* (Kitosh); *cherengisia* (Kimasai); *lisiamogoma* (Luragoli); *isiamakom* (Lutereki); *kandi* (Kiamu).

Variation. Males possess two, occasionally even three, rows of preanal pores, posterior row has from 8-13 pores, average 11.0, the second 8-12, average 10.1.

Coloration. When brought into camp, one of the Lamu females was brown; after being anaesthetised with cyanide potassium the head

became a most brilliant blue, also the sides except for a line of red spots, vertebral line verdigris green.

Measurements. The largest male (M. C. Z. 41096) measures 303+ (143 + 160+) mm.; the largest female (M. C. Z. 41073) measures 255 (125 + 130) mm., a Lamu female with the same snout to anal measurement has a mutilated tail.

Breeding. Between February 10 and 15, a Kaimosi female held 6 eggs measuring 18 x 11 mm.; on May 7 a Lamu female held 9 eggs measuring 11 x 11 mm.; another, but slightly smaller, taken at the same time held a single egg measuring 21 x 17 mm., it seems possible that the native captor had taken her when engaged in ovipositing.

Parasites. Nematodes (*Physaloptera amaniensis*) were numerous in Kaimosi agamas, presumably it is the same species and *Strongylurus* sp. with which most of the others in the above series are infested.

Enemies. One was recovered from the stomach of a Hissing Sand Snake (*Psammophis sibilans*) at Bukori.

Folklore. The Watereki say that this lizard attracts lightning to a tree or house, the fact is proved because when lightning strikes a tree or house it is usual to find one or more of these lizards lying dead!

An English lad at Kitale told me that he had been told by another boy at Nairobi School, that these lizards are very poisonous and donkey's blood was the only cure for the bite!

ZONURIDAE

ZONURUS TROPIDOSTERNUM Cope

Zonurus tropidosternum Cope, 1869, Proc. Amer. Philos. Soc., 11, p. 169: "Madagascar." (errore)

Zonurus frenatus Pfeffer, 1889, Jahrb. Wiss. Anst. Hamburg, 6, p. 6: Mhonda, Tanganyika Territory.

1 (M. C. Z. 39955) Sokoki Forest, K. C. vi.1932. H.J.A. Turner.

Distribution. This specimen is the first recorded member of the genus *Zonurus* to be taken in Kenya Colony, and constitutes a noteworthy northerly extension of the range.

Variation. It differs from the type (M. C. Z. 5742) of *tropidosternum* in that its nasals form a suture which separates the rostral from the frontonasal. Nieden (1913, pp. 71-74) has dealt very fully with the variability of this character, showing how both types occur together on Tendaguru Mountain, near Lindi, and crop up in erratic fashion throughout the Territory.

For this reason I do not refer the Sokoki specimen to *Z. parkeri* Cott, a species whose nasals form a suture in the type but are separated in the paratype, for I think it may eventually prove to be a synonym of *tropidosternum*. Cott was mistaken in assuming that the caudal scales of *tropidosternum* are not serrated, they are as serrated in the type as in the type of *parkeri*; in a juvenile, however, the serrations are not noticeable, though well-developed in adults from the same locality (Morogoro, near Mhonda) as well as in the Sokoki lizard; this would appear to be an age character.

In the type of *tropidosternum* and the Sokoki specimen, the 2nd finger extends a claw and scale length beyond the 5th. In three Morogoro lizards the 2nd finger only extends a claw length beyond the 5th while in the type of *parkeri* "it does not, or scarcely extends beyond the 5th."

The 3rd and 4th fingers are nearly equal, or the 3rd minutely shorter than the 4th in the type of *tropidosternum*, as well as the rest of our series, which would not seem to differ greatly from the condition obtaining in *parkeri* where the "third finger is shorter than the fourth."

The 2nd toe is equal to the 5th in the type of *tropidosternum* so that it was an error to assume that the 2nd extended beyond the 5th in the type of *tropidosternum*; it barely extends to the 5th in the type of *parkeri*, it is shorter than the 5th in the Sokoki lizard, shorter than, or equal to, in the Morogoro series (incidentally it is equal to in *ukingensis*).

The 2nd toe is much shorter than the 4th both in our series of *tropidosternum* (including the type) as well as in the types of both *parkeri* and *ukingensis*, so that alleged difference also disappears.

Measurements. Total length 168 + (86 + 82 +) mm.; the tip of the tail is missing.

CHAMAESAURA TENUIOR Günther

Chamaessaura tenuior Günther, 1895, Ann. Mag. Nat. Hist. (6), **15**, p. 524, pl. xxi, fig. B: Kampala, Uganda.

Chamaesaura annectans Boulenger, 1899, Proc. Zool. Soc. London, p. 97: Ravine Station, Mau Mountains, Kenya Colony. 7,500 feet.

1 ♂ 5 ♀ (M. C. Z. 41101-5) Kaimosi, K. C. 12.ii.34.

Distribution. I was shown a dried skin, presumably referable to this species, at Kacheliba, northeast Uganda. This would constitute a northward extension of the range.

Native names. *Mugoye* (Luragoli); *shikoye* (Lutereki).

Variation. Midbody scale-rows 24; longitudinal rows between occiput and anus 38-40; hind limbs monodactyle except M. C. Z. 41104 where they are didactyle; femoral pores 1.

I (1929, p. 59) have discussed the variations and synonymy of a much larger series collected by Heller in this same locality.

Measurements. The largest ♀ (M. C. Z. 41101) surpasses even Heller's largest, it measures 637 (135 + 502) mm., two others have also a head and body length of 135 mm., a third is 137 mm. but the tails are not so fine; the single ♂ (M. C. Z. 41105) measures 97 mm. from snout to anus.

Breeding. All five females are gravid, two examined hold 9 and 10 embryos respectively, one of these latter was measured and found to be 117 (35 + 82) mm.

VARANIDAE

VARANUS OCELLATUS Rüppell

Varanus ocellatus Rüppell, 1827, Atlas Reise nörd. Afrika, p. 21, pl. vi: Kordofan, Anglo-Egyptian Sudan.

Egg & 2 (M. C. Z. 41106-8) Mt. Mbololo, K. C. 25-28.iv.34.

3 (M. C. Z. 41109) Lamu, Lamu Id., K. C. 7.v.34.

1 (M. C. Z. 41110) Kitau, Manda Id., K. C. 15.v.34.

1 (M. C. Z. 41111) Malindi, K. C. 30.vi.34.

1 (M. C. Z. 41112) Sokoki Forest, K. C. vi.1932. H.J.A.T.

Native names. *Mongagi* (Kitaita); *uru* (Kiamu, Kipokomo and Kiswahili).

Measurements. The largest ♀ (M. C. Z. 41107) measured 1150 (510 + 640) mm., the second ♀ from the same locality had a similar snout to anus measurement but the tip of its tail was lacking. The smallest, one of a series of four young collected by Mr. H. J. Allen Turner, only measures 300 (140 + 160) mm.

Breeding. On April 25, at Mbololo, this large female held 34 eggs, each measuring about 55 x 31 mm., ready for deposition.

Dict. Her stomach was empty except for parasites. Stomach contents of others in the series were as follows: (1) five huge, wingless, stridulating, spiky grasshoppers, a hard-shelled beetle, two millipedes, two operculae of large snails. Mbololo; (2) nine large cockchafers, four hawk-moth larvae, a green caterpillar, numerous small insects. Lamu; (3) many ants, a few termites, a green cetonid and other beetle elytra. Lamu; (4) many cockchafers and smaller beetles, three large

caterpillars, two snails; the intestines also were well-filled with the elytra of beetles. Lamu; (5) many of the hard-shelled, black beetles which are common above high-tide lines, a millipede. Kitau.

Parasites. Ticks (*Amblyomma marmoreum* and *A. exornatum*) were collected on the Mbololo monitors, the second species only on Lamu specimens. Doubtless the ticks occurring on the other monitors in the series are referable to one or other of these species.

Nematodes (*Physaloptera paradoxa*) were collected from the stomachs of the Mbololo and Lamu monitors, a huge mass of them in the gravid female from the first locality. At Kitau a native brought in a fairly large specimen in a terribly emaciated condition, there was little left of the tail but skin and bone. On opening it, I found, as anticipated, a heavy infestation of worms (*Polydelphis* sp.) though the stomach was well-supplied with a good assortment of food as recorded above.

Enemies. Marketed as food by some of the Lamu natives, presumably non-Moslem elements of the population.

Habitat. I was constantly disturbing these huge lizards in the dry underbrush of certain restricted areas on Lamu Island where they must be exceedingly common. I shot the Malindi specimen as it raised its head from the edge of a black, coral-rag cliff as I passed along the reef below; under these conditions the big head reminded me strongly of photographs of Galapagos marine iguanas in similar situations. Its tail was truncated just posterior to the anus, the stump long-since healed.

VARANUS NILOTICUS (Linnaeus)

Lacerta nilotica Linnaeus, 1766, Syst. Nat., ed. 12, p. 369: Egypt.

1 (M. C. Z. 41113) Ngatana, Tana River, K. C. 11.vi.34.

Distribution. Also 7 from Sokoki Forest (H.J.A.T.) examined. I especially refrained from collecting more than one of these common and useful lizards. Others were seen at Karita River camp (9.xi.33), Amaler River camp (xi.33), Greeki River camp (4.xii.33), Bukori (18.i.34), Kaimosi (19.ii.34), Tsavo (3.iv.34), Mkonumbi (29.v.34), Belazoni (5.vi.34) and in many spots during my canoe journey up the Tana River.

Native names. *Anakana* (Karamojong); *imbulu* (Luragoli and Lutereki); *gedo* (Kipokomo).

Enemies. Eaten by the Wapokomo of the Tana River.

AMPHISBAENIDAE

GEOCALAMUS ACUTUS Sternfeld

Geocalamus acutus Sternfeld, 1912, Wiss. Ergeb. Deut. Zentral-Afrika-Exped. 1907-1908, 4, p. 209: Voi, Kenya Colony.

16 (M. C. Z. 41114-23) Voi, K. C. 7-13. iv.34.

Distribution. Sternfeld based his description on two specimens of which the second was attributed to "Deutsch Ostafrika" collected by Huebner. We know, however, that Huebner lived at Kibwezi, west of Voi, for many years and most of the species obtained by him I found at Kibwezi. It seems likely that the second specimen came from that locality. I take this opportunity of restricting the type locality to Voi in view of the possibility of error respecting the place of origin of the second example cited in the original description. At Voi I found it on the flats at Msinga Estate and near the northwest foot of Mount Mbololo.

Native names. *Kilimagonde* (Kisagalla and Kitaita); *moore* (Kitaita, but this name was also applied to the local caecilian).

Variation. Midbody scale-rows 38-42; transverse rows on body and tail 231-245, of which about 21-23 are on the tail; upper labials 3; lower labials 2, except No. 41119 which has 3 like *modestus*; no post-frontal; temporals 2-4 being very subject to subdivision.

Coloration. In life a delicate flesh pink. In alcohol each dorsal scale violet brown edged with lighter, immaculate white below or scales beneath the tail irregularly mottled with violet brown.

Measurements. The largest known specimen, a ♀ (M. C. Z. 41115), measures 281 (248 + 33) mm., the smallest (M. C. Z. 41116) measures 105 (93 + 12) mm.

Breeding. No signs of gestation observed.

Diet. A large individual held what was apparently a young worm or caecilian, another some skin of what may have been a caterpillar, in all there was much soil and grit possibly indicating that they swallow it like earthworms to obtain such nutriment as it may contain.

LACERTIDAE

LACERTA JACKSONI Boulenger

Lacerta jacksoni Boulenger, 1899, Proc. Zoöl. Soc. London, p. 96, pl. x: Ravine Station, Mau Mountains, Kenya Colony. 7,500 feet.

Lacerta jacksoni kibonotensis Lönnberg, 1907, in Sjöstedt, Kilimandjaro, Meru Exped., 4, Rept. & Batr., p. 5: Kibonoto, Mount Kilimanjaro, Tanganyika Territory.

55 (M. C. Z. 41124-50) Sipi, U. 12-24.xii.33.

1 (M. C. Z. 41151) Buluganya, U. 12.i.34.

2 (M. C. Z. 41152-3) Elgonyi, K. C. 20.i.34.

17 (M. C. Z. 41154-63) Kaimosi, K. C. 10-28.ii.34.

6 (M. C. Z. 41164-9) Mt. Mbololo, K. C. 18.iv.34.

Distribution. Boulenger's locality "Kegamaia" is a corruption of Kakamega, the specimens actually came from Kaimosi, Kakamega as did those listed above. As the species has been recorded from Mombo it may descend to below a 1,500 foot level though more abundant in montane forests at 6,500 feet. Lönnberg (1922, p. 3) had already recorded it at that altitude on the eastern slopes of Mount Elgon, the first three localities cited above are at approximately the same altitude on the western and southern aspects.

Native names. *Mabusiiba* (Lugishu); *kelondangombe* (Luragoli); *shinakombero* (Lutereki); *malasagasa ya murtu* (Kitaita).

Variation. Based on fifty specimens only. Midbody dorsolateral scale-rows 37-49, except for one lizard (M. C. Z. 41134) with 54, average 43.1; the outer rows of the ventrals while normally enlarged sufficiently to be counted, making 8 longitudinal rows, are quite frequently so reduced that they should not be reckoned as such; normally 4 labials anterior to the subocular but 5 occurring on one side of the head, or both, in every locality; femoral pores on right leg 15-21, average 18.

Measurements. The largest ♂ (M. C. Z. 41129) measures 204 (81 + 123) mm.

Breeding. Two females from Sipi hold ova of 4 and 7 mm. diameter respectively, two others from Kaimosi, approximately two months later, each held four eggs, the lots measuring 14 x 7 and 15 x 7 mm. respectively.

Diet. Ten stomachs examined, held the following: (1) moth, (2) moth, (3) moth and small beetle, (4) beetles, (5) beetles, (6) big beetle and weevil, (7) many beetles including weevil and spiders, (8) numerous hard-shelled beetles, two spiders and a cockroach, (9) two crickets with long ovipositors, (10) spiders.

Parasites. Larval tapeworms of the Dithridium group (which complete their development in carnivores) infested the peritoneal surfaces of both abdomen and liver in several of the Sipi lizards.

Enemies. The tail of one of these lizards was recovered from the stomach of a green snake (*Chlorophis hoplogaster*) at Sipi, the lizard itself had evidently escaped.

Habitat. In a deforested area at Buluganya, I disturbed a Jackson's lizard under debris of plantains in a banana plantation by the river. While writing in my tent in a forest clearing at Elgonyi, I saw and caught one of these lizards as it was running over my boxes, the second specimen from that locality, where they appeared to be scarce, I shot as it was basking beside a hole in the tree in which it lived. I shot the Mbololo series on big trees on the eastern, northern and southern edges of the forest cap at 4,800 feet.

Folklore. The Luragoli name for this arboreal lizard refers to their belief that it 'follows the cows', it would seem as if they had confused it with some other species of terrestrial lizard but no other was taken in the vicinity. It is probable that the belief was imported into the district when the people migrated there.

ALGIROIDES ALLENI Barbour

(Plate 7, fig. 1)

Algiroides alleni Barbour, 1914, Proc. New England Zoöl. Club, 4, p. 97: northeast slope Mount Kenya, Kenya Colony.

28 (M. C. Z. 41170-89) Kaburomi, U. 27-30.xii.33.

1 (M. C. Z. 41190) near Madangi, U. 2.i.34.

Distribution. Both these localities are on the western slopes of Mount Elgon in the alpine zone at 10,500 and 11,500 feet respectively. They constitute the first records of the occurrence of this species on Mount Elgon though Mr. H. W. Parker tells me that the British Museum has a series from Majuwa (? Mujur of map) on the mountain.

Corrigenda. Two important corrections are necessary to the key of the genus *Algiroides* given by Boulenger (1920, p. 339). He includes *alleni* in the section of the key with "temporal scales keeled" whereas the types, as well as all in the above series, have smooth temporals as in the European forms. The word 'dorsals' appears to have been inadvertently dropped from the last line of the key (p. 340) which was intended to read "the laterals and anterior dorsals entirely smooth."

Variation. Nostril between two nasals, first labial, and frequently the rostral also; a supernumary loreal split off from the postnasal

in one specimen; supraoculars in contact with supraciliaries in all; parietals in contact with upper postocular in 24 lizards, separated on right side in 1 (M. C. Z. 41175), on both sides in 4 (M. C. Z. 41171, 41173-4); temporals smooth in all; enlarged plates in collar 4-6, usually flanked on either side by a smaller one; transverse rows of ventrals from collar backwards 22-29, average 25.3; longitudinal rows of dorsolaterals at midbody 18-22, average 20.7; lamellae under fourth toe 16-21, average 18.3; femoral pores 10-13, average 11.3.

Coloration in life. ♂. Above, crown of head and broad dorsal band ochraceous brown, each head scale with one spot of sepia brown, inner edge of supraoculars deep black; a narrow, black, vertebral line from occipital scale to tip of tail; a lateral band (three scales wide) deep brown narrowly bordered by a black and then a pale yellow line both above and below, these tend to converge as they approach the tail; sides of body and limbs flecked with deep black; upper lip white, each of the posterior labials with a black spot. Below, throat to gular fold iridescent, slightly greenish, white; rest of under surface of body, hind limbs, and tail, deep orange which becomes paler towards the sides.

♀. Above, as in male but much darker. Below, throat to gular fold dull white, gular fold to in front of anus slightly greenish white, around anus faintly tinged with orange; below tail salmon pink.

It is interesting to observe the close similarity in pattern and coloring of many of the *Mabuya v. varia* which occur in similar situations at Kaburomi and exhibit similar habits.

Measurements. The largest ♂ (M. C. Z. 41177) with perfect tail, measures 147 (52 + 95) mm., a ♀ (M. C. Z. 41171) measures 58 mm. from snout to anus but has a regenerated tail. More than half the series have regenerated tails, indeed it is most unusual for an adult to have a perfect tail.

Breeding. The testes of the males are large but none of the females has indications of developing ova.

Diet. In addition to more minute insects, the following stomach contents were noted: (1) caterpillar, (2) caterpillar, (3) caterpillar and ant, (4) caterpillar and winged ant, (5) apparently a full-fed lycaenid caterpillar, (6) caterpillar and spider, (7) spider and orthopteran, (8) spider and praying mantid, (9) cockroach and beetle, (10) three small beetles.

Habitat. These lizards occur in the alpine meadows above the timber line. They sleep in the dense tussocks of grass growing about clumps of the cactus-like *Acanthus* from which they emerge to bask

in the sunshine during the middle of the day (*circa* 10 a.m. to 3 p.m.). If disturbed while basking they are quick to seek refuge under the base of the plant but are not very difficult to dislodge with a stick. When captured they make some show of biting but their tiny teeth have no effect on the human skin.

None was seen in the vicinity of the rest camp at Madangi, though they probably occur there as *M. v. varia* is common enough in the neighborhood, the specimen listed was actually taken six or seven miles north of Madangi.

LATASTIA LONGICAUDATA REVOILI (Vaillant)

Eremias revoili Vaillant, 1882, Miss. Révoil Pays Comal., Rept., p. 20, pl. iii, fig. 2: Somaliland.

16 (M. C. Z. 41191-200) Kibwezi, K. C. 23-24.iii.34.

1 (M. C. Z. 41201) Tsavo, K. C. 4.iv.34.

3 (M. C. Z. 41202-4) Voi, K. C. 10.iv.34.

3 (M. C. Z. 41205-7) Mbololo Mt., K. C. 20.iv.34.

1 (M. C. Z. 41208) Malindi, K. C. 29.vi.34.

Distribution. Also 1 from Sokoki Forest (H. J. A. T.).

Native name. Ngozo (Kitaita, but not specific).

Variation. Midbody dorso-lateral scale-rows 58-67, average 63.1; gular scales between symphysial and collar 32-43, average 36.2; transverse rows of ventrals 26-30, average 28.2; lamellae beneath fourth toe 22-29, average 24.4; femoral pores 8-11, average 9.5.

Coloration. A pair taken in *coitu* at Kibwezi clearly displayed the dimorphic coloring. The ♂ showing much darker transverse barring than the female, in the latter such bars being only faintly indicated. In the ♀ the longitudinal lines are either much more pink than in the ♂ or show to better advantage.

Measurements. Both the largest ♂ (M. C. Z. 41201) and ♀ (M. C. Z. 41198) possess regenerated tails, from snout to anus they measure 100 mm. and 82 mm. respectively.

Breeding. Three females taken at Kibwezi each held 4 eggs, these ranged from 6 x 6 mm. to 8 x 5 mm.; a Voi female held 3 eggs measuring 10 x 7 mm.; two Mbololo females each held 3 eggs measuring 11 x 7 mm.

Dict. Of the ten stomachs examined, seven held grasshoppers, one being distended with numerous newly-hatched grasshoppers besides an adult; of those remaining, two were distended with termites and one held a large smooth-skinned caterpillar.

Parasites. Small larval tapeworms (*Dithyridium*) were present in the body cavity of a Kibwezi lizard.

Enemies. The largest male was recovered from the stomach of a Two-striped Sand Snake (*Psammophis biseriatus*) at Tsavo, possibly it fell an easy prey because it was so gorged on termites, also it had no tail to discard as it was regenerating from the basal stump. At Mbololo another was found in the stomach of a Spotted Sand Snake (*Psammophis punctulatus*).

Habitat. I ran one to earth in a rat hole in a cotton plantation from which I had previously seen it emerge, and at the entrance of which it was basking. Though both nest and food of the rodent were in the burrow the owner was absent.

EREMIAS NEUMANNI Tornier

Eremias neumanni Tornier, 1905, Zoöl. Jahrb. Syst., **22**, p. 376: Brussa Valley, north of Lake Stephanie, Ethiopia.

66 (M. C. Z. 40201-50) Ngatana, Tana River, K. C. 11-16.vi.34.

Distribution. These constitute the first record of the occurrence of this species in Kenya Colony, and are the first examples taken since the type was described thirty years ago. Ngatana is rather more than 500 miles southeast of the type locality.

Native name. *Mvuvi* (Kipokomo, but not specific. This is the word for a caecilian in Kiuluguru).

Affinities. Boulenger (1921, p. 20) suggested that this species was identical with *Eremias siebenrocki* Tornier of Porto Novo, Dahomey, which he transferred to the genus *Latastia* on the strength of Nieden's remarks (1913, p. 77). Elsewhere (1933, p. 306) I have shown the falsity of Nieden's conclusions resulting from his identifying *Latastia johnstoni* with *E. siebenrocki*.

E. neumanni is certain to be distinct from *siebenrocki* and is undoubtedly an *Eremias* though possessing many characters common to *Latastia* and in Boulenger's key (1921, p. 227) heading the list by falling into Section I, A.

Variation. The following addition to our knowledge of variation in this species, is based on the individual examination of the fifty tagged examples from Ngatana.

Midbody dorsolateral scale-rows 40-48, average 43.8 (the type had 46); transverse rows of ventrals 22-30, extremes rare, average 25.6 (the type had 26); longitudinal rows of ventrals 6 (the type had 8,

Tornier presumably counted as ventrals the outer row of very small smooth scales which Boulenger treats as laterals); nostril between three nasals (except on the right side of M. C. Z. 40205 where fusion of the upper and lower postnasals has taken place) separated from the first upper labial by a narrow rim; 5 labials anterior to the subocular as in the type, except for five specimens where there are 4 and three where there are 6; femoral pores 8-12, average 10 (the type had 10). For the last two items, labials and pores, only the right jaw and right leg of each specimen were examined.

Measurements. The largest specimen, a ♀ (M. C. Z. 40248) measures 146 (53 + 93) mm., but is 12 mm. larger than the next of which there are half-a-dozen with a head and body length of 47 mm. The smallest example (M. C. Z. 40234) measures 66 (25 + 41) mm.

Breeding. It seems possible that the main breeding season was over though half-a-dozen females were gravid. One held 3 eggs measuring 8 x 6 mm., another 3 measuring 9 x 5 mm., a third 2 eggs measuring 11 x 6 mm.

Diet. Spiders, as many as half-a-dozen in one stomach, would appear to constitute the principle article of diet with orthoptera, chiefly young grasshoppers, a close second. The egg capsule of a cockroach, but no cockroach, was present in one stomach. It should be borne in mind, however, that small insects which are masticated beyond recognition, may figure in the menu quite considerably.

Parasites. Two larval Spiuroidea present in one stomach.

Enemies. One Neumann's lizard was recovered from the stomach of a snake (*Boaedon lineatus*).

EREMIAS SPEKII SPEKII Günther

Eremias spekii Günther, 1872, Ann. Mag. Nat. Hist. (4), 9, p. 381: Unyamwezi, Tanganyika Territory.

Eremias rugiceps Peters, 1878, Monatsb. Akad. Wiss. Berlin, p. 202, pl. ii, fig. 1: Taita, Kenya Colony.

38 (M. C. Z. 41209-41) Kibwezi, K. C. 23-30.iii.34.

9 (M. C. Z. 41242-9) Mt. Mbololo, K. C. 23-28.iv.34.

1 (M. C. Z. 41250) Sokoki Forest, K. C. vi.32. H. J. A. Turner.

Distribution. The series from Mount Mbololo, Taita, are topotypes of *E. rugiceps* Peters, which has the characteristics of the typical race and has been referred to its synonymy by Boulenger (1921, p. 235). The Sokoki Forest lies but a few miles south of Malindi and thus marks

the northern limits of the typical form upon the coast, it was one of a series collected there in 1932, now in Nairobi Museum.

Native name. Ngozo (Kitaita, but not specific).

Variation. Femoral pores 12-18, average for thirty-one specimens 15. All agree with the type in having the subocular bordering the lip, but the Sokoki lizard approaches the northern race in having six, instead of five, light longitudinal lines on the posterior half of the body.

Measurements. The largest ♂ (M. C. Z. 41237) measures 184 (60 + 124) mm., the largest ♀ (M. C. Z. 41210) has the same length (60 mm.) from snout to anus but has a regenerated tail. These surpass any in Boulenger's fine series.

Breeding. Four gravid females in the Kibwezi series were found to be carrying ova, 4 in three instances, 5 in one. These measured 5 x 5 mm., 9 x 6 mm., 11 x 6 mm., and 11 x 6 mm., these last two lots were clearly ready for laying. At the same time it was noticed that considerable numbers of young *spekii* were running about the paths, such juveniles measured about 85 (30 + 55) mm.

Diet. Termites were present in each of ten stomachs examined, in addition one held an antlion, another a relatively large spider.

Parasites. One of the Kibwezi series was found to be affected with the same larval tapeworm (*Dithyridium*) already recorded for *Latastia l. revoili*.

Enemies. A Speke's Lizard was recovered from the stomach of a Cape Wolf Snake (*Lycophidion c. capense*).

EREMIAS SPEKII SEXTAENIATA Stejneger

Eremias sextaeniata Stejneger, 1883, Proc. U. S. Nat. Mus., 16, p. 718: Tana River, Kenya Colony.

13 (M. C. Z. 41251-9) Karita River Camp, U. 9.xi.33.

7 (M. C. Z. 41260-6) Mkonumbi, nr. Witu, K. C. 28.v.34.

3 (M. C. Z. 41267-8) Golbanti, Tana R., K. C. 23.vi.34.

3 (M. C. Z. 41269-70) Karawa, K. C. 26.vi.34.

2 (M. C. Z. 41271-2) Malindi, K. C. 28.vi.34.

Distribution. The Golbanti specimens may be considered topotypes. The series from Karita River appear to constitute the first records for Uganda for as I have shown elsewhere (1929, p. 64), Boulenger's inclusion of Uganda in the distribution was based on a specimen from Ndi, Uganda Railway, Kenya. This fresh material bears out the views already expressed (1929, p. 65) as to the meeting points of the two races, Takaungu being just south of the Malindi-Sokoki area.

Native names. *Agerigeri* (Karamojong, probably for lacertids in general).

Variation. With the exception of a Malindi Lizard (M. C. Z. 41271) where the arrangement on the right side of the head is that of the typical form, all the series agree with the types of *sextaeniata* in having the subocular excluded from the lip by labials.

Labials anterior to middle of orbit 4-5, in equal proportions; dorso-lateral scales at midbody 58-74, average 63.8; longitudinal rows of ventrals 6; transverse rows of ventrals 23-29 (but only nine specimens examined); plates in collar 6-9, average 7; lamellae under fourth toe 20-25, average 21.7; femoral pores 10-17, average 13.6.

Coloration in life. The color of Mkonumbi specimens was much brighter than those from Karita River which presented an appearance very similar to the typical form though possessing the six lines of *sextaeniata*.

At Mkonumbi the dorsal pair of lines are cream colored; the dorso-lateral china white anteriorly, cream faintly tinged with yellow posteriorly; the outer lateral 'lines' are broken up into a series of pale yellow dashes below which is a series of pale green dots that touch the outermost row of ventrals.

At Golbanti the brick-red ground color was brighter in some specimens than in others, the lines pure white, the 'line' of lateral spots white, the lower series grass-green.

Measurements. The largest ♂ (M. C. Z. 41265) measures 158 (48 + 110) mm., the largest ♀ (M. C. Z. 41259) measures 148 (48 + 100) mm.

Breeding. At Karita River, most, if not all, of the females were gravid with developing ova of 2.5 x 3.5 mm. to eggs of 11 x 6 mm. An Mkonumbi ♀ held 4 eggs measuring 9 x 6 mm. At Karawa a young lizard was captured which measured only 63 (23 + 40) mm.

Diet. As in the typical form, termites predominated, being present in the half-dozen Karita lizards examined, a large caterpillar was present in one. A caterpillar was also found in the stomach of an Mkonumbi specimen.

GERRHOSAURIDAE

GERRHOSAURUS MAJOR MAJOR Duméril

Gerrhosaurus major Duméril, 1851, Cat. Méthod. coll. Rept., Paris, p. 139: Zanzibar.

Gerrhosaurus bergi Werner, 1906, Zoöl. Anz., 30, p. 54, figs. 1-3: Usambara Mountains, Tanganyika Territory.

♂ (M. C. Z. 41273) Voi, Kenya Colony. 10.iv.34.

♂ (M. C. Z. 41274) Mt. Mbololo, K. C. 22.iv.34.

Distribution. Also 3 from Sokoki Forest (H. J. A. T.).

Variation. Longitudinal rows of dorsals 19-20; longitudinal rows of ventrals 10; frontonasals paired as in *bergi*, in contact with the rostral in the ♀, separated from the rostral by the supranasals which form a broad suture in the ♂. Fairly recently, I (1929, p. 66) discussed the instability of the head shields in this species.

Measurements. The ♂ measures 440 (180 + 260) mm., the ♀ measures 518 (206 + 312) mm.

Breeding. The latter holds a single developing, 114 mm., ovum in addition to numerous smaller ova.

Parasites. Nematodes (*Physaloptera* sp.) were removed from the Voi specimen.

Habitat. I dislodged her from among drifted leaves in a rock fissure in dense thorn scrub, after disturbing her basking in the vicinity.

GERRHOSAURUS FLAVIGULARIS FLAVIGULARIS Wiegmann

Gerrhosaurus flavigularis Wiegmann, 1828, Isis, p. 379: "Africa merid. Krebs."
Gerrhosaurus flavigularis forma *intermedia* Lönnberg, 1907, in Sjöstedt, Kilimandjaro, Meru Exped., 4, Rept. & Batr., p. 7, pl. figs. 1 a-b: "on the steppe near the Natron lakes, Kibonoto," Tanganyika Territory.

12 (M. C. Z. 41275-9) Voi, Kenya Colony. 7-10.iv.34.

4 (M. C. Z. 41280-2) Mt. Mbololo, K. C. 19.iv.34.

1 (M. C. Z. 41283) Ngatana, K. C. 17.vi.34.

1 (M. C. Z. 41284) Golbanti, K. C. 22.vi.34.

Distribution. Also 7 from Sokoki Forest (H. J. A. T.).

Native names. *Malombo* (Kitaita); *nakavara* (Kipokomo).

Variation. Longitudinal rows of dorsals 20-22; longitudinal rows of ventrals 8; femoral pores 13-15, average 13.5; prefrontals broadly, or barely, in contact except in two Voi lizards where they are separated; laterals keeled or smooth in Mbololo series.

Measurements. All are considerably smaller than the largest Tanganyika records, the largest (M. C. Z. 41280) is a ♀ measuring 475 (142 + 333) mm., three others have a head and body length of 142 mm.

Breeding. In both Voi and Mbololo females are ova in all stages of development, the best developed consist of four eggs each almost ready for deposition; eggs in these three lots measure approximately 27 x 15 mm., 24 x 11 mm., and 21 x 11 mm. respectively.

Diet. Stomach contents consisted of: (1) grasshopper, (2) grasshopper, (3) three grasshoppers, (4) grasshopper and grass, (5) a locust about four inches in length, (6) several crickets of two species, (7) two cockroaches and what appeared to be beetle remains, (8) scales of a large *Gerrhosaurus*, apparently part of the cast skin of the lizard in whose stomach they were found.

SCINCIDAE

MABUYA MACULILABRIS (Gray)

Euprepis maculilabris Gray, 1845, Cat. Liz. Brit. Mus., p. 114: West Africa.

9 (M. C. Z. 41285-90) Mt. Debasien, U. 14-29.xi.33.

1 (M. C. Z. 41291) Below Sipi, U. 15.xii.33.

3 (M. C. Z. 41292-3) Kau, Tana R., K. C. 4.vi.34.

1 (M. C. Z. 41294) Golbanti, K. C. 23.vi.34.

5 (M. C. Z. 41295-7) Ngatana, K. C. 17-20.vi.34.

1 (M. C. Z. 41298) Changamwe, K. C. 4.vii.34.

Distribution. Also 1 from Sokoki Forest (H. J. A. T.).

Native names. *Lamatwan* (Karamojong); *kikomiakar* (Lugishu); *mvuvi* (Kipokomo, but not specific).

Variation. Midbody scale-rows 30-34, this range holds good for Mount Debasien alone, from whence came the only specimen with 30 scales; keels on dorsal scales 5-9; supraoculars 4; supraciliaries 4-6, normally 5; prefrontals in contact in 4 skins, separated in 16; supranasals in contact in 3 skins, separated in 17.

Coloration in life. A male from Mount Debasien had the sides of its head and throat lemon yellow shading to a brick orange on the flanks. The male from Sipi had the lower lip, anterior half of the body and the flanks suffused with red like the laterite soil of the vicinity where it was taken.

My general impression in the field was that the Debasien series were more uniformly brown and rather more slender in habit than those taken at the coast and at Sipi on Mount Elgon where the rainfall, resulting in greater abundance of insect life, is more plentiful. The Sipi male and coastal series approximate to Sternfeld's race of *major*.

Measurements. The largest ♂ (M. C. Z. 41293) measures 200 (86 + 124) mm., the largest ♀ (M. C. Z. 41294) measures 218 (95 + 123) mm., but are surpassed in tail length by a ♂ with a 142 mm. tail and a ♀ whose tail measures 146 mm.

Breeding. Females were gravid both inland and on the coast, thus

a ♀ taken on Mount Debasien, November 29, 1933, held 5 eggs measuring 11 x 7 mm., an Ngatana ♀, taken June 17-20, 1934, held 13 eggs (which must constitute a record for the species ?) measuring 12 x 8 mm.

Habitat. Between 5,000 and 7,000 feet on Mount Debasien where one was captured among undergrowth on an earthy bank, another on rocky ledges in a stream bed, a third basking high on a tree trunk, a fourth on a pile of vegetation and yet another beneath sacks in a tent. The Ngatana series were on the walls of a deserted building by the river bank. The Changamwe male in the matting sheath of a young coconut palm at a height of six feet from the ground.

MABUYA PLANIFRONS (Peters)

Euprepes (Euprepis) planifrons Peters, 1878, Monatsb. Akad. Wiss. Berlin, p. 203, pl. ii, fig. 2: Taita, Kenya Colony.

Euprepes (Euprepis) taitanus Peters, 1878, Monatsb. Akad. Wiss. Berlin, p. 203, pl. ii, fig. 3: Taita, Kenya Colony.

Mabuia diesneri Sternfeld, 1911, Sitzber. Ges. Naturf. Freunde Berlin, p. 248: Kibwezi, Kenya Colony.

1 (M. C. Z. 41311) Kibwezi, K. C. 23.iii.34.

3 (M. C. Z. 41312) Voi, K. C. 9.iv.34.

10 (M. C. Z. 41313-20) Mt. Mbololo, K. C. 23.iv.34.

5 (M. C. Z. 41323-6) Lamu, Lamu Id., K. C. 7.v.34.

2 (M. C. Z. 41327-8) Kitau, Manda Id., K. C. 15.v.34.

1 (M. C. Z. 41329) Peccatoni, K. C. 26.v.34.

2 (M. C. Z. 41321-2) Golbanti, K. C. 22.vi.34.

4 (M. C. Z. 41330-3) Malindi, K. C. 28.vi.34.

Distribution. Seen also at Witu and Mkonumbi, and 3 from Sokoki Forest (H. J. A. T.) examined. These records show that this species extends right up the coast and serves to link Lönnberg's record for Kismayu, Italian Somaliland and Parker's for Nogul Valley, British Somaliland with the type locality.

It will be noted that a good series of topotypes of *planifrons* and *taitanus* were obtained on Mbololo in Utaita, in addition to a single topotype of *diesneri* during the week spent at Kibwezi.

Native name. *Jumbakoka* (Kiamu).

Synonymy. The topotype of *diesneri* served to confirm me in my action of referring this species to the synonymy of *planifrons* (1923, p. 956). I now add *taitanus* which was based on a younger specimen than the type of *planifrons*. With one exception there is nothing in the

descriptions which is not within the range of age and variation in *planiceps*.

At the time of publication of the Catalogue of Lizards, vol. 3, only the types were known. They had, however, been seen by Boulenger (1887, pp. 167, 171) who differentiated them thus:

Ear lobules, if present, short. *planifrons*
 Ear opening partly concealed under the rounded scales of its anterior border. *taitana*

In one of my topotypes which has received a blow on one side of the head, the ear opening corresponds to the above description for *taitana* on that side but is like *planifrons* on the other. As, to the best of my belief, no second specimen of *taitana* has been taken since it was described nearly sixty years ago, I respectfully suggest that a careful reëxamination of the type will show that the head has either been slightly damaged, or else forced back against the neck prior to fixation, which would result in the rounded scales of the anterior border of the ear-opening partly concealing the aperture.

Variation. Midbody scale-rows 26-30, only one of the former and two of the latter, normally 28, three with 29; scales tricarinate except for three specimens which have quinquecarinate scales though the outermost pair are faint; supranasals in contact; prefrontals separated¹ except for three individuals in which the frontonasal and frontal form a X suture; supraoculars 4; supraciliaries 4-7, normally 5; supralabials anterior to subocular 4-5, more frequently the former.

Relative limb length is an age character, thus in a young skink measuring 30 mm. from snout to anus, the adpressed hind limb reaches to the elbow of the backward-pressed fore limb while in a 113 mm. adult the tips of the toes barely meet those of the fingers.

Coloration. The great majority of these Kenya specimens differ from those of Tanganyika by the conspicuous lines of black spots down the length of the back, the nut-brown instead of khaki ground colour, and more vivid coloring generally.

In this respect the Tanganyika skinks serve to link these typical *planifrons* with *binotata* Bocage of Angola (a valid species erroneously referred to the synonymy of *quinquetacniata* by Boulenger (1887, p. 198)). As one proceeds northward *planifrons* appears to give rise to *somalicus* Calabresi distinguished by having 32 midbody scale-rows as a normal condition instead of a rare one as is the case with Kenya and

¹The condition in all the Tanganyika series listed in Bull. Mus. Comp. Zoöl., 74, p. 315 where a misprint read "prefrontals in contact" instead of "prefrontals not in contact."

Tanganyika planifrons. Ultimately both *planifrons* and *somalicus* may prove to be races of *binotata* which was described in 1867.

Measurements. The largest ♂ (M. C. Z. 41330) measures 253 (113 + 140) mm. but is surpassed in tail length by others with tails of 208 and 205 mm., the largest ♀ (M. C. Z. 41321) measures 339 (107 + 232) mm.

It will be seen that the tail may constitute two-thirds of the total length, a condition only met with in *megalura* so far as East African skinks are concerned. So long a tail, however, is exceptional for there seems to be a good deal of individual variation in this respect.

Breeding. Testes large in several of the males examined, ova small in the largest ♀ (M. C. Z. 41321) taken on June 22, 1934, when sunning with another on a hollow tree in scrub country.

Diet. Stomachs examined held: (1) locusts, (2) 3 grasshoppers, 2 large caterpillars, (3) 2 grasshoppers, 2 large caterpillars, (4) cricket and hard-shelled beetle, (5) a great many small beetles, (6) small beetles.

Habitat. Captured in crumbling ruins of native huts at Voi. On Lamu Island they were fond of sunning on logs or piles of coconut-palm fronds, when seriously disturbed they would dash for the nearest palm and, ascending the stem with great celerity, soon be lost among the dense foliage above. On Manda Island one was basking on a stump at 9 a.m., the other on the stem of an acacia in the late afternoon. Perhaps the majority were found sunning on fallen logs for which they appeared to display a preference.

MABUYA BREVICOLLIS (Wiegmann)

Euprepes brevicollis Wiegmann, 1837, Arch. für Natur., p. 133: Ethiopia (as Abyssinia).

Mabuya chanleri Stejneger, 1893, Proc. U. S. Nat. Mus., 16, p. 721: Tana River, Kenya Colony.

1 (M. C. Z. 41299) Karita Camp, U. 9.xi.34.

4 (M. C. Z. 41300-3) Kibwezi, K. C. 23-25.iii.34.

3 (M. C. Z. 41304-6) Tsavo, K. C. 4.iv.34.

3 (M. C. Z. 41307-9) Voi, K. C. 9.iv.34.

1 (M. C. Z. 41310) Mt. Mbololo, K. C. 22.iv.34.

Variation. Midbody scale-rows 32, except for M. C. Z. 41305 which has 30; supranasals in contact in 6 specimens, separated in 6; prefrontals in contact in 4 specimens, separated in 8; frontal in con-

tact with 1st and 2nd, or 1st, 2nd and 3rd supraoculars; supraoculars 4; supraciliaries 4-6, average exactly 5.

Coloration. Two young, measuring 50 and 54 mm. from snout to anus, were taken at Kibwezi and Mount Mbololo respectively. They are black with white spots and are so distinct from the adult coloring that it is small wonder that Stejneger made one the type of a supposedly new species, *chanleri*. Such young are rare in collections.

Measurements. The largest specimens are all males, the maximum length from snout to anus is 150 mm. (M. C. Z. 41306), the longest tail measures 170 mm. (M. C. Z. 41301).

Breeding. The testes of four males examined were small.

Diet. Stomachs examined held: (1) locust, (2) grasshopper, (3) many small grasshoppers, (4) termites.

Parasites. Nematodes of a new genus and species and ♀ ♀ of an oxyuroid (*Pharyngodon* sp.) were present in two of four skinks examined from Kibwezi and Tsavo.

Enemies. One Voi specimen was recovered from the stomach of a sand snake (*Psammophis biseriatus*).

Habitat. At Kibwezi these skinks occur among the piles of lava which cover so much of the country east and west of Kibwezi station. On being approached they slip quietly away so that it is more usual to obtain a glimpse of a vanishing tail than of a skink. The only way to obtain them was by shooting with dust shot from a .22 gun. Owing to the exceptionally hot weather, these skinks only appeared to bask for an hour or two in the early morning so that one had to restrict hunting to this limited period. I never saw more than two in an hour and considered myself fortunate if one of these was secured.

The day after our arrival at Tsavo, I caught sight of one of these skinks disappearing among the ruins of a native hut; it had been basking on the crumbling lumps of mud of which the walls had been composed. Though I revisited the place time and again I never got another glimpse of the reptile. A native was set to work with a pick and shovel to remove the wall, a dusty and unsavoury task. After I had watched him remove half-a-cartload, we gave up, and I ordered him to set two snap-back rat traps baited with cheese. On previous occasions this method had proved successful, the skink being attracted by the insects which gathered on the bait. The following day we took the skink from the trap and shortly afterwards secured a second at the same spot, in the same trap.

MABUYA MEGALURA (Peters)

Euprepes (Mabuia) megalura Peters, 1878, Monatsb. Akad. Wiss. Berlin, p. 204, pl. ii, fig. 4: Taita, Kenya Colony.

3 (M. C. Z. 41334-6) Kaimosi, K. C. 25.ii.34.

1 (M. C. Z. 41337) Malindi, K. C. 29.vi.34.

Distribution. A very fine specimen escaped me at Ngatana, it was clambering about in long grass at a height of three feet from the ground.

Native name. *Lubuyu* (Luragoli). It is surprising that the Maragoli do not distinguish between this lizard and the serpentiform *Riopa anchictae*, when chided about it they replied "Why should we? We don't eat them."

Variation. Midbody scale-rows 26 in the plateau specimens, 22 in the skink from the coastal plain. This is a new low number, the range heretofore being 24-28, our other coastal material is normal.

Coloration. Two of the three Kaimosi females have a lineolate appearance below, this results from the longitudinal sutures of the breast and belly scales being plumbeous, the third female is uniformly white beneath.

Breeding. These two largest Kaimosi females, measuring 73 mm. from snout to anus, are gravid, holding ten and eleven embryos respectively, these were fully formed and with very little yolk remaining.

Diet. Stomachs examined, held (1) cricket, (2) cricket and spider, (3) spider, (4) two isopods in the Malindi skink.

MABUYA QUINQUETAENIATA OBSTI Werner

Mabuia obsti Werner, 1913, Mitt. Nat. Mus. Hamburg, **30**, p. 43: Kwa Mtoro, Central Province, Tanganyika Territory.

Mabuia quinquetaeniata hildebrandti Sternfeld (not of Peters), 1917, Wiss. Ergebn. Zwei, Deutsch. Zent.-Afrika-Exped. 1910-1911, **1**, p. 438, pl. xxiv, fig. 3: Taita, Kenya Colony.

Intermediates

1 (M. C. Z. 41338) Kacheliba, U. 8.xi.33.

4 (M. C. Z. 41339-42) Karita River, U. 9.xi.33.

1 (M. C. Z. 41343) Nabagut, Greeki R., U. 6.xii.33.

1 (M. C. Z. 41344) Elgonyi, K. C. 22.i.34.

Typical *obsti*

3 (M. C. Z. 41345-7) Tsavo, K. C. 30.iii.34.

45 (M. C. Z. 41348-79) Mt. Mbololo, K. C. 16-26.iv.34.

Distribution. Skinks from Ethiopia, northern Uganda, and northern Kenya are intermediate between typical *quinctaeniata* of Egypt and the Sudan and the larger tropical race *obsti* which I now recognize for the first time as a result of studying the long series of topotypic *hildebrandti* from Mbololo in Taita. These intermediates agree with typical *quinctaeniata* in the number of midbody scale-rows, but with *obsti* in the immaculate throat of the male.

Native names. *Longisia* (Kimasai); *malasagasa* (Kitaita, but not specific).

Variation. (Intermediates) Midbody scale-rows 36–40, average 38.1; prefrontals in contact in eight skinks, separated in two; supraciliaries 5–6, average 5.6; supralabials anterior to subocular 4.

(Typical *obsti*) Midbody scale-rows 42–48, average 44.2; prefrontals in contact in twenty-four skinks forming a X with frontal and frontonasal in two, separated in twenty-two; supraciliaries 5–7, average 6.2; supralabials anterior to subocular 4, except on one side in three skinks which have 5; the subocular of one skink is not larger than the adjacent labials.

It might be remarked that in the fifty-eight Egyptian skinks counted by Anderson (1898, pp. 187–193) the range of midbody scale-rows is 35–42, average 37.6.

Measurements. The largest ♂ (M. C. Z. 41357) measures 252 (101 + 151) mm., the largest ♀ (M. C. Z. 41379) measures 239 (97 + 142) mm.

Breeding. The only gravid ♀ was one from Mount Mbololo which held 7 eggs measuring 17 x 9 mm.

Diet. Stomachs examined, held: (1) termites and ants, (2) termites and ants, (3) termites, ants and grasshopper, (4) termites, grasshopper, beetle and millipede, (5) termites and caterpillar, (6) grasshopper, (7) large orthopteran, (8) cricket, (9) cricket, (10) cricket.

Parasites. Nematodes (gen. et sp. n.) were present in skinks from Karita River and Mount Mbololo.

Habitat. Like the hyrax, this skink depends on rocky outcrops which restrict its distribution. At Kacheliba, Elgoni and Mbololo they were on kopjes, along the Karita, Greeki and Tsavo Rivers among exposed rocks.

MABUYA VARIA VARIA (Peters)

(Plate 8, fig. 1)

Euprepes (Euprepis) varius Peters, 1867, Monatsber. Akad. Wiss. Berlin, p. 20: Tete, Mozambique.

- 6 (M. C. Z. 41380-3) Above Sipi, U. 7,000 ft. 14.xii.33.
77 (M. C. Z. 41384-449) Kaburomi, U. 10,000 ft. 28-31.xii.33.
7 (M. C. Z. 41450-3) Madangi, U. 11,500 ft. 3-4.i.34.
2 (M. C. Z. 41454) Kibwezi, K. C. 2,985 ft. 23.iii.34.
6 (M. C. Z. 41455-8) Mt. Mbololo, K. C. 4,000 ft. 16.iv.34.
1 (M. C. Z. 41459) Gongoni, K. C. 200 ft. 27.vi.34.

Natives names. *Kikunya* (Lugishu); *malasagase* (Kitaita, but not specific).

Variation. The long series from the alpine zone of Mount Elgon, were collected as they seemed to me to be different from those with which I was familiar at lower levels. Apart from smaller size, however, critical examination in the laboratory has failed to reveal any character which may not be matched sometime by a skink from lower levels. In this connection see also the remarks on coloration. The following statistics while revealing the variation in the whole series, apply equally well both in range and average number of scale-rows to the montane (7,000 to 11,500 feet) group alone, nor do the latter exhibit any variation in these characters, except for carination as noted, which is not shared by the small series from lower levels.

Midbody scale-rows 30-34, average 32.1, *except* for the coastal (Gongoni) specimen which has only 28 rows, the first record of so low a number; scales tricarinate in all except three Mbololo skinks in which a few scales are quattuor- or quinquecarinate; prefrontals in contact in 11 skinks, forming an X with frontal and frontonasal in two, separated in seventy-seven; frontoparietals distinct; subocular bordering lip in all.

Coloration. That of adult (not young) males from Sipi is suffused with rufous on the flanks both above and below the lateral line; below they are bright mustard yellow from nape to anus, almost all the gular, and in some specimens the ventral and subcaudal scales as well, are edged with black.

At Kaburomi, I was impressed by the striking resemblance in dorsal markings and coloration which these skinks bore to *Algiroides allenii* whose habitat and habits seemed similar, below, however, *allenii* was bright reddish orange.

The dorsolateral line in the montane specimens was reduced to hair-like proportions, in typical specimens it is ribbon-like, forming a white band almost a scale wide. At Kibwezi, however, the band is lacking and I noted in the field that the coloration was "quite black," the skink being shot while basking on the black lava which covers so much of the countryside in the vicinity of the station.

Measurements. Of the montane lizards, the largest ♂ (M. C. Z. 41412) measures 133 (52 + 81) mm., and largest ♀ (M. C. Z. 41398) 141 (63 + 78) mm., being about 10 mm. less in length from snout to anus than large lowland skinks.

Breeding. Very many of the Kaburomi females are gravid; of half-a-dozen dissected one held 8 ova measuring about 8 mm. in circumference, the rest had from 4 to 6 embryos in every stage of development. A Kibwezi skink held embryos almost ready for parturition. One female in the Mbololo series was gravid, its ova being in about the same stage of development as those of the Kaburomi skink with 8 eggs.

Diet. Stomachs examined, held: (1) beetle, (2) beetle, hemipteron, caterpillar, (3) cricket, spider, (4) cricket and own sloughed scarf-skin.

Parasites. Nematodes (*Thubunaea asymmetrica*), and a new genus and species, were common in the Kaburomi skinks.

Enemies. Augur Buzzards, harriers and kestrels were seen, both at Kaburomi and Madangi, quartering over the alpine meadows where these skinks appeared to be the dominant form of vertebrate life. There were five skinks in the stomachs of one buzzard (*Buteo r. augur*), and one in another, shot at Kaburomi; one skink in a kestrel (*Falco t. tinnunculus*) shot near Madangi.

It was interesting to note that only two of these seven skinks had dropped their tails when captured, that the little creatures live a hazardous life in these uplands is obvious from the fact that the great majority of the ninety collected had reproduced tails: the latter may be distinguished by their having single transversely enlarged scales below, instead of the numerous small scales present on the original portion.

Habitat. Astonishingly abundant in the alpine meadows, these skinks behave in much the same way as does the lizard (*Algiroides allenii*), which see for further details.

MABUYA STRIATA (Peters)

Tropidolepisma striatum Peters, 1844, Monatsber. Akad. Wiss. Berlin, p. 36: Mozambique.

- 3 (M. C. Z. 41461-2) Mt. Debasien, U. 16.xi.33.
- 1 (M. C. Z. 41463) Sabei, Elgon, U. 9.xii.33.
- 1 (M. C. Z. 41464) Sipi, Elgon, U. 27.xii.33.
- 2 (M. C. Z. 41465) Butandiga, Elgon, U. 8.i.34.
- 5 (M. C. Z. 41466-8) Kirui's, K. C. 19.i.34.
- 5 (M. C. Z. 41469-71) Kaimosi, K. C. 10.ii.34.
- 2 (M. C. Z. 41472) Mt. Mbololo, K. C. 17.iv.34.

2 (M. C. Z. 41473) Lamu Island, K. C. 7.v.34.

1 (M. C. Z. 41474) Mombasa Id., K. C. 3.vii.34.

Distribution. Seen also at Kitale, Nabagut and Molo.

Native names. *Lamatwan* (Karamojong); *matundi* (Lugishu); *longisia* (Kimasai); *lisiagali* (Luragoli); *lisiakali* (Lutereki); *malasagasa* (Kitaita, but not specific); *jumbakoka* (Kiamu).

Variation. Midbody scale-rows 34-40 for Debasien series alone, or exclusive of Debasien series; keels 3-7, an age character as young have only three, subsidiary keels, usually faint but sometimes strongly developed, appear in older skinks; prefrontals in contact in three skinks, separated in nineteen; frontoparietals distinct except in a Lamu skink where fusion has almost certainly resulted from an injury when young.

Measurements. The largest skink, a ♂ (Lamu), measures 208 (93 + 115) mm., but the tip of its tail is missing; the largest ♀ (M. C. Z. 41466) measures 93 mm. from snout to anus but the tail is regenerating.

Breeding. On January 8, a ♀ from Butandiga held 6 spherical ova about 7 mm. in diameter; on January 19, one ♀ from Kirui's village held 6 ova about 8 mm. diameter, while another had 6 very young embryos; on February 10, a ♀ from Kaimosi had 6 large, but unpigmented, embryos.

Diet. Two skinks held beetles, two termites, two a grasshopper each, while one held a cockroach and snail, the shell of the latter gone.

Parasites. A nematode was recovered from only one stomach out of ten examined.

Enemies. Striped skinks were recovered from the stomachs of a hawk (*Melierax m. metabates*) on Debasien, a wolf snake (*Lycophidion c. capense*) and a green snake (*Chlorophis hoplogaster*) at Sipi, and from the latter species only at Kaimosi.

Habitat. In miombo bush on Debasien, where it ascends trees and behaves like *maculilabris*, all three were shot on trees; elsewhere chiefly obtained on the walls of rest camps or native huts. The Sipi skink lived for several days in the tent, apparently sleeping in the tent pockets. The tent was struck at night. Several days after our arrival at Kaburomi, where the species does not occur, its flattened tailless body was found in one of the tent pockets.

MABUYA IRREGULARIS Lönnberg

(Plate 8, fig. 2)

Mabuia (*striata* ? var.) *irregularis* sp. n. ? Lönnberg, 1922, Arkiv for Zoöl., **14**, p. 4: Soy, Kenya Colony.

♀ (M. C. Z. 41460) Kaburomi, 10,500 ft., U. 28.xii.33.

Distribution. Though only about forty miles northwest of the type locality, this record not only constitutes the first occurrence of this montane form on Mount Elgon, but an addition to the herpetofauna of Uganda. Formerly known from Mount Kenya and the Aberdare Range.

Variation. Midbody scale-rows 34; supraciliaries 4; parietals separated posteriorly by the interparietal, each parietal shield bordered by 4 scales only 1 of which is enlarged so that there is but a single pair of nuchals enlarged.

Measurements. This ♀ measures 150 (75 + 75) mm.

Breeding. Five scaled and pigmented embryos, within about a week of parturition, display the most astonishing variation in development. Of three measured, one is 64 (31 + 33) mm., another 66 (29 + 37) mm., and the third 47 (23 + 24) mm.

Diet. The stomach held two species of weevil, an ant (probably *Pheidole* sp.), two parasitic hymenoptera (*Proctotrypidae*), two caterpillars and two species of spiders. I am indebted to Dr. Joseph Bequaert for these identifications.

Parasites. Nematodes (*Thubunaca asymmetrica*) present in the stomach.

RIOPA MABUIIFORMIS Loveridge

Riopa mabuiiformis Loveridge, 1935, Bull. Mus. Comp. Zoöl., **79**, p. 12: Ngatana, Tana River, Kenya Colony.

11 (M. C. Z. 40266-71) Ngatana, Tana River, K. C. 14-19.vi.34.

These are the type and paratypes of a smooth-scaled species with 28 to 30 midbody scale-rows.

Native name. *Lukumvivi* (Kipokomo for all three species of *Riopa* occurring in this locality).

Diet. Stomachs examined, held: (1) large black cricket and own slough, (2) both items as in one, (3) grasshopper.

Habitat. Taken beneath vegetable debris heaped on raised banks separating the flooded rice-fields just north of the grove of mango trees.

RIOPA TANAE Loveridge

Riopa tanae Loveridge, 1935, Bull. Mus. Comp. Zoöl., **79**, p. 11: Kau, near the mouth of the Tana River, Kenya Colony.

- 14 (M. C. Z. 40251-9) Kau, Tana River, K. C. 4.vi.34.
 1 (M. C. Z. 40261) near Witu, north of Kau, K. C. 31.v.34.
 2 (M. C. Z. 40264-5) Ngatana, Tana R., K. C. 19.vi.34.
 2 (M. C. Z. 40262-3) Golbanti, Tana R., K. C. 23.vi.34.

These are the type and paratypes of a smooth-scaled species with 22 to 24 midbody scale-rows. Native name as for last species.

Breeding. Most, or all, of the adult females in the series from Kau were gravid, holding from 2 to 3 ova or embryos, some of the latter were fully formed, furnishing evidence that the species is viviparous. On June 23, a Golbanti female held 3 eggs measuring 9 x 5 mm.

Diet. Crickets were definitely present in two skins but the food was so well masticated in the other specimens examined that it was indeterminable.

RIOPA SUNDEVALLII (Smith)

Eumices (Riopa) sunderallii A. Smith, 1849, Illus. Zoöl. South Africa, 3, App., p. 11: Natal.

- 2 (M. C. Z. 41475-6) Mt. Debasien, U. 22.xi.33.
 1 (M. C. Z. 41477) Sipi, Mt. Elgon, U. 12.xii.33.
 2 (M. C. Z. 41478-9) Kibwezi, K. C. 23.iii.34.
 29 (M. C. Z. 41480-99) Voi, K. C. 7-12.iv.34.
 2 (M. C. Z. 41500) Mt. Mbololo, K. C. 17.iv.34.
 9 (M. C. Z. 41501-7) Lamu Id., K. C. 5.v.34.
 1 (M. C. Z. 41508) Mkonumbi, K. C. 28.v.34.
 2 (M. C. Z. 40260, 41509) Witu, K. C. 31.v.34.
 20 (M. C. Z. 41510-23) Ngatana, K. C. 12-19.vi.34.
 1 (M. C. Z. 41524) Golbanti, K. C. 22.vi.34.
 2 (M. C. Z. 41526) Malindi, K. C. 29.vi.34.
 2 (M. C. Z. 39967-8) Sokoki Forest, K. C. vi.32. H.J.A.T.

Native names. *Kilimagonde* (Kitaita, but not specific); *kiumambusi* (Kiamu); *lukumvivi* (Kipokomo).

Variation. Midbody scale-rows 24-28, only one Debasien and two Mbololo skins with 28, average 25; rostral separated from fronto-nasal except in three Ngatana skins which agree with *productum* Boulenger in this respect; frontonasal broader than long except in three skins (M. C. Z. 41498-9, 41526) where it is longitudinally divided; prefrontals and frontoparietals distinct; nostril between supranasal and two smaller nasals except in one Ngatana skin where the two nasals are fused into a single scale on the right side only; second toe well in advance of fifth.

Coloration in life. Halfgrown specimens at Voi were noted as being plumbeous, or black, above; light below. The throat of an adult Ngatana male was a beautiful lemon-yellow color.

Measurements. The largest ♂ (M. C. Z. 41481) measures 193 (122 + 71) mm., but his tail is regenerated; the largest ♀ (M. C. Z. 41480) measures 225 (118 + 107) mm.

Breeding. In mid-June, at Ngatana, one skink held 4 eggs measuring approximately 13 x 7 mm., another held eggs 18 x 9 mm. On June 19, I came upon six eggs measuring 19 x 11 mm. in a cavity in a large termitarium, situated at the edge of a rice-swamp; many adult skinks were disturbed and captured during the process of demolishing the termites' hill. On July 4, four of these eggs were found to have hatched, the emerged young measuring 62 (24 + 38) mm.

Diet. Stomachs examined held: (1) caterpillar, (2) grasshopper, (3) grasshopper and hemipteron of the Thyreocoridae, (4) beetle larvae, (5) termites, (6) minute snails, (7) sandhopper at Lamu.

Enemies. Sundevall's skinks were recovered from the stomach of a wolf snake (*Lycophidion c. capense*) at Kibwezi, and a burrowing viper (*Atractaspis bibronii*) at Chamgamwe. One Ngatana skink had no digits on the hind limbs, the right fore limb had a bud, while stumps of digits remained on the left fore limb.

RIOPA MODESTUM MODESTUM (Günther)

Sepacontias modestus Günther, 1880, Ann. Mag. Nat. Hist. (5), 6, p. 235: Mpwapwa, Ugogo, Tanganyika Territory.

5 (M. C. Z. 41527-30) Tsavo, K. C. 3.iv.34.

19 (M. C. Z. 41531-45) Voi, K. C. 7-13.iv.34.

5 (M. C. Z. 41546-50) Mt. Mbololo, K. C. 23-29.iv.34.

Relationships. Recently, Parker (1932, pp. 357-361) has thrown considerable light on the tangled status and synonymy of the north-east African skinks of this group, further he has provided a really excellent and workable key.

At the time of its appearance, I had some manuscript in hand in which I adduced reasons for regarding *modestum* as a race of *sundevallii*, and let this go to press (1933, p. 322) rather than reinvestigate the whole business. I am now entirely convinced that Parker's arrangement is the correct one and that I was wrong in laying such emphasis on the abnormal individuals which I regarded as intermediates. Further proof is now furnished by the fact that both *sundevallii* and *modestum* occur together at Voi and Mbololo.

Variation. Midbody scale-rows 24-27, average 24.6, definitely less than in Tanganyika Territory material; rostral separated from fronto-nasal; prefrontals distinct; nostril between a supranasal and postnasal only; second toe well in advance of the fifth.

Coloration in life. The males at Voi were a beautiful lemon-yellow shade below, similar to the throat of a male *sundevallii*.

Measurements. None exceeded measurements previously given for this species, several had a snout to anal length of 80 mm., their tails being regenerated.

Breeding. In early June most of the Voi females held 2, rarely 3, developing ova; of these one pair measured 5 mm. in diameter, two pairs 7 mm., and a fourth lot of three eggs 13 x 6 mm.

Diet. Stomachs examined held: (1) caterpillar, (2) grasshopper, (3) grasshopper and earwig, (4) cricket, (5) termites.

Habitat. As Tsavo is the type locality of *Lygosoma gromeri*, I made an especial attempt to secure skinks of this group. I captured a female *modestum* beneath a heap of tanning bark that had been lying abandoned for years. Putting it in a test-tube, I sent it round to the few natives attached to this isolated station. An Mtaita brought in three which he had hoed up in his garden, unfortunately all had lost their tails as he was afraid of them. I do not think that *gromeri* is an aberrant *modestum*, it seems to be a *Siaphos* with a divided fronto rostral, otherwise near *kilimensis*. It should be looked for on the highest kopjes near Tsavo, where forest may have existed in past centuries.

RIOPA PEMBANUM (Boettger)

Lygosoma (Riopa) pembanum Boettger, 1913, in Voeltzkow, Reise in Ost-Afrika, **3**, p. 350, pl. xxiv, figs. 4-5: Pemba Island.

1 (M. C. Z. 39969) Sokoki Forest, K. C. (H.J.A.T.) vi.32.

Distribution. Parker (1932, p. 361) was the first to record this skink from the African mainland, this addition to the Kenya fauna being based on two skinks in the British Museum from Takaungu which lies between the Sokoki Forest and Pemba Island. It occurs with *sundevallii* at Sokoki, has 24 midbody scale-rows and the prefrontals lacking, being fused with the frontonasal.

RIOPA ANCHIETAE (Bocage)

(Plate 7, fig. 2)

Eumeces anchietae Bocage, 1870, Journ. Sci. Lisboa, **3**, p. 67, pl. i: Huilla Plateau, Mossamedes, Angola.

- 1 (M. C. Z. 41551) Kirui's Village, K. C. 23.i.34.
27 (M. C. Z. 41552-71) Kaimosi, K. C. 10-28.ii.34.

Native name. *Luhuyu* (Luragoli and Lutereki).

Variation. Midbody scale-rows 22-26, only M. C. Z. 41558 with 22 and M. C. Z. 41563 with 26; fingers 2, toes 3, except for a few skinks which appeared to have lost their digits azygously by accident, for example M. C. Z. lacks the right fore limb while its right hind limb is devoid of digits.

Measurements. The largest perfect ♂ (M. C. Z. 41551) measures 492 (171 + 321) though surpassed in body length by many in the Kaimosi series which have regenerating tails.

Breeding. In mid-February four Kaimosi females held from 4 to 8 embryos, the highest number being in the largest female, which ranged from very minute embryos to fully formed and pigmented skinks measuring 128 (52 + 76) mm.

Diet. Stomachs examined held: (1) to (5) grasshoppers, (6) grasshopper, caterpillar, termites and a millipede, (7) cockroach and its egg-case, caterpillar, weevil, (8) beetles, moth, (9) grasshopper, wasp, (10) large spider. In addition two of these skinks had a mass of their own sloughed scales in their stomachs.

SIAPHOS KILIMENSIS (Stejneger)

Lygosoma kilimensis Stejneger, 1891, Proc. U. S. Nat. Mus., **14**, p. 405: Kilimanjaro, Tanganyika Territory.

Lygosoma clathrotis Boulenger, 1900, Ann. Mag. Nat. Hist. (7), **6**, p. 194: Foot of Mount Kenya, Kenya Colony.

- 3 (M. C. Z. 41572-4) Voi, K. C. 10.iv.34.
15 (M. C. Z. 41575-85) Mt. Mbololo, K. C. 16-26.iv.34.

Distribution. I am a little doubtful of the data of the Voi material, it is possible that I collected them along the Voi River and confused them in the field with *Riopa m. modestum* to which they bear so strong a resemblance in coloration and habit, though not in habitat. Alternatively they may have been brought in to my Voi camp by a native who may possibly have secured them on one of the neighbouring hills.

Native name. *Kilimagonde* (Kitaita, but not specific).

Affinities. Boulenger referred his *clathrotis* to the section *Liolepisma*. I have reexamined the specimen from Nairobi River (U. S. N. M. 42517) which I referred to *clathrotis* (1929, p. 78) and find it indistinguishable from *kilimensis*. It is true that the type of *clathrotis* was

said to have 22 midbody scale-rows but, though rare, skinks with this number occur alongside those with 24 on Mbololo. Moreover Dr. Malcolm Smith informs me that he has reexamined the type of *clathrotis* and finds it had 24 (not 22) midbody scale-rows. He confirms my action in referring *clathrotis* to the synonymy of *kilimensis*.

Variation. Midbody scale-rows 22-24, all but two with 24; lamellae under fourth toe 12-15; limbs pentadactyle.

Measurements. The largest ♂ (M. C. Z. 41577) measures 173 (72 + 101) mm., the largest ♀ is 2 mm. less in length from snout to anus, tail regenerated.

Breeding. Only two of the females are gravid. On April 16, I found 24 eggs, each measuring about 14 x 8 mm., beneath a single log in the forestry nursery at the edge of the rain forest. The eggs contained young skinks some of which were found to measure 49 (23 + 26) mm. It was difficult to say how many eggs constituted a clutch as most were scattered about, one group, however, well separated from the rest, comprised four eggs which agrees with the number previously recorded by Barbour & Loveridge (1928, p. 163) as found in a gravid female in the Uluguru Mountains. In addition to the 24 fresh eggs, there were many others which had hatched out and appeared to have belonged to a previous breeding season.

Returning to the forestry nursery on the following day, April 17, I uncovered 68 more fresh eggs of which about 50 were found under one log. This log was favourably situated on the east side of the nursery close to the western edge of the rain forest where the sun would not reach it until noonday. In the loose soil adjacent to the eggs, five adult skinks were taken of which two were gravid and had presumably come to this spot to lay. It should be remarked that there were an abundance of logs lying along the forest edge yet the skinks had concentrated their laying under a few. The finding of these eggs appears to point to a definite breeding season. Hatched-out shells from a previous season were present beneath this log also.

On April 23, two of the eggs hatched out skinks which measured 58 (26 + 32) and 56 (26 + 30) mm. respectively. On April 26, two more hatched. I then packed all the eggs in appropriate soil and mailed them to the London Zoological Gardens, but they did not hatch.

Diet. Stomachs examined, held: (1) spider, (2) spider and caterpillar, (3) spider and hymenopteran, (4) spider and woodlouse, (5) caterpillar.

Parasites. Nematodes (gen. et sp. n.) were present in the stomach of one lizard.

Enemies. One of these skinks was recovered from the stomach of a house snake (*Boaedon lineatus*) which I found in the hollow log beneath which so many eggs were located on April 17. The house snake was only halfgrown, the skink was a very large one.

Habitat. These skinks were in the habit of basking on sunlit patches beside the paths which penetrated the forest, others were captured at the base of wild banana plants in the forest.

ABLEPHARUS BOUTONII AFRICANUS Sternfeld

Ablepharus boutonii africanus Sternfeld, 1918, Abh. Senckenb. Nat. Ges., **36**, p. 423: Manda Id., Malindi and Pemba Id.

3 (M. C. Z. 41586-7) Lamu Id., K. C. 12.v.34.

10 (M. C. Z. 41588-95) Kitau, Manda Id., K. C. 15.v.34.

6 (M. C. Z. 41596-600) Malindi, K. C. 30.vi.34.

Distribution. The Kitau and Malindi series are topotypes of this race.

Variation. Midbody scale-rows 22-24, average 22.7.

Measurements. The largest ♂ (M. C. Z. 41593) measures 107 (44 + 63) mm., the largest ♀ (M. C. Z. 41595) measures 111 (45 + 66) mm.

Breeding. In mid-May, three females on Lamu and Manda Islands each held two eggs measuring 12 x 5 mm., at the latter locality one held a pair of eggs measuring 7 x 4 mm., another had small ova. At Malindi breeding appeared to be over on June 30.

Diet. The stomachs of ten specimens examined held remains of minute insects (nymphal orthopterans ?) and crustacea too masticated to be identifiable except for a cockroach and beetle.

Habitat. These littoral skinks were very common on the rocks forming the breakwater along the sea front by the wireless station on Lamu Island. They were presumably introduced with the rock as all rock on Lamu has been imported by dhow.

Abundant on the rock masses scattered along the shore near Ras Kitau, where they appear to be feeding more on insects than is the case at Mombasa. These specimens were killed with dust shot from .22.

At Malindi they were plentiful on the coral cliffs at the extreme south end of the bay, about a mile south of the township. Naturally they do not occur elsewhere in the sandy bay or near the town. My ammunition being exhausted, I armed myself with a towel and pair of long forceps. The towel should be rolled up lengthwise and the two

ends held in the hand. Having approached within striking distance, a sudden blow is given with the soft towel, this usually only disconcerts the skink, at most stunning it momentarily so that it is necessary to pounce upon the reptile with all possible speed. If it has fallen, or slipped into one of the numerous fissures, the forceps will be found invaluable for recovering the little reptile without injuring its tail.

ABLEPHARUS WAHLBERGII (Smith)

Cryptoblepharus wahlbergii Smith, 1849, Illus. Zool. S. Africa, **3**, App. p. 10: Natal.

Ablepharus carsonii Boulenger, 1894, Proc. Zool. Soc. London, p. 735, pl. xlix, figs. 4-4a: Fwamba, Northern Rhodesia.

Ablepharus massaiensis Angel, 1924, Bull. Mus. Hist. Nat. Paris, p. 52: Masai Plains near Nairobi, Kenya Colony.

23 (M. C. Z. 41601-10, 41614-7) Kaimosi, K. C. ii.34.

1 (M. C. Z. 41611) Voi, Coast Province, K. C. 9.iv.34.

1 (M. C. Z. 41612) Golbanti, Tana R., K. C. 2.v.34.

1 (M. C. Z. 41613) Lamu, Lamu Island, K. C. 5.v.34.

Native name. *Lisiakali* (Lutereki, but not specific). The Watereki natives who gave me this name believed this little skink to be the young of *Mabuya striata*. When the difference was pointed out, they still maintained that *lisiakali* was the only name that they had for it, and asked what reason was there that they should have another seeing that it was not good to eat.

Synonymy. *A. carsonii* was differentiated from *wahlbergii* because of the fusion of the frontoparietals with the interparietal to form a single large shield. Four of the skinks in the Kaimosi series agree with *carsonii* in this respect and others from this locality show intermediate conditions of parietal fusion. *A. carsonii* was based on a single specimen which I must assume was an aberrant individual.

The aberration is, however, of major importance as it throws such individuals into the first section of Boulenger's (1887, p. 344) key. So important a variation should not be lost sight of. It will be observed that the head shields of this species are subject to considerable fusion.

Variation. Midbody scale-rows 22-26, average 23.8; frontoparietals and interparietal fused to form a single shield (as in *carsonii* and *boutonii*) in four skinks (M. C. Z. 41614-7), the frontoparietals are fused but interparietal distinct (*i.e.* like *wahlbergii*) in the rest of the series except for a few where the separation is ill-defined; prefrontals separated except in M. C. Z. 41601 in which the left pre-

frontal is fused with the frontal, and M. C. Z. 41616 where they are in contact; supraoculars 3 (*wahlbergii*) except in two skins which have 3-2 and two others which have only 2 (*massaiensis*) as the result of fusion.

Measurements. The largest is a ♀ (M. C. Z. 41608) measuring 131 (53 + 78) mm.

Breeding. Between February 17 and 28, most of the Kaimosi females appear to be gravid, three examined held 4, 5, and 6 eggs respectively, the lots measuring approximately 3 x 5, 4 x 4 and 4 x 8 mm. A young skink, presumable nearly a year old, measured 44 (19 + 25) mm.

On May 5, at Lamu, several skins were seen among the fallen leaves which blanketed the sand about the base of an old mango tree. One egg was found beneath the leaves, it contained an embryo measuring 13 mm. from snout to anus, the tail tip now missing.

Diet. Stomachs examined, held: (1) termites, (2) termites, (3) three termites and four spiders, (4) a beetle and apparently a beetle larva.

Enemies. A Wahlberg's Skink was recovered from the stomach of a Cape Wolf Snake (*Lycophidion c. capense*) at Kaimosi.

Habitat. The Voi skink was taken among the crumbling ruins of a native hut on the Msinga Estate.

ACONTIAS PERCIVALI Loveridge

Acontias percivali Loveridge, 1935, Bull. Mus. Comp. Zoöl., 79, p. 13: Foot of Mount Mbololo, Taita Mountains, Kenya Colony.

39 (M. C. Z. 40175-200) Mt. Mbololo, K. C. 26-30.iv.34.

Distribution. The majority of these, the type series, came from Kitibu at the west, or northwest foot of the mountain.

Breeding. No signs of it in fifteen specimens examined.

Diet. Stomachs examined, held: (1) termites, (2) termites, (3) termites and ants, (4) ants' heads, (5) beetle, (6) beetle, (7) beetle larva, (8) beetle larva, (9) hairy caterpillar, (10) caterpillars and small cricket, (11) millipede. In addition two skins had their own sloughs in stomach or intestines and many had much sandy soil of the district, apparently ingested with food.

Parasites. Nematodes (*Thelandros* sp. n.) were present in the intestines of three of the largest specimens examined.

CHAMAELEONTIDAE

CHAMAELEON SENEGALENSIS Daudin

Chamaeleo senegalensis Daudin, 1802, Hist. Nat. Rept., 4, p. 203: Region watered by the Senegal and Niger Rivers; Gambia and Guinea.

Chamaeleon laevigatus Gray, 1863, Proc. Zool. Soc. London, p. 95: 500 miles south of Khartoum, Anglo-Egyptian Sudan.

1 (M. C. Z. 41618) w. foot of Mt. Debasien, U. 16.xi.33.

4 (M. C. Z. 41619-22) Lukungu, w. foot Mt. Elgon, U. 8.i.34.

13 (M. C. Z. 41623-32) Bukori, s. foot Mt. Elgon, K. C. 18.i.34.

Native name. *Agiar* (Karamojong, but not specific).

Synonymy. Dr. H. Heckenbleikner, in his forthcoming monographic revision of the genus, can find no grounds for regarding *laevigatus* (hitherto applied in a subspecific sense to East African specimens) as distinct from *senegalensis*.

Measurements. The largest ♂ (M. C. Z. 41619) measures 184 (108 + 76) mm., the largest ♀ (M. C. Z. 41623) measures 170 (105 + 65) mm.

Breeding. On January 8, the two females from Lukungu were gravid with 14 eggs measuring 6 mm. diameter, and 7 eggs measuring 7 mm. diameter respectively. On January 18, however, half-a-dozen females from Bukori exhibit undeveloped ova. The difference may be explainable by prolonged drought at Bukori?

Diet. Stomachs examined, held: (1) beetles, (2) flies, (3) ants?, (4) ants?, (5) grasshopper.

Habitat. The Debasien specimen was found clinging to some stout grass in an area swept over by grass fires the previous day though somewhat patchily burnt.

CHAMAELEON GRACILIS GRACILIS Hallowell

Chamaeleo gracilis Hallowell, 1842, Journ. Acad. Nat. Sci. Philad., p. 324, pl. xviii: Monrovia, Liberia.

1 (M. C. Z. 41633) Mt. Debasien, 5,000 ft., U. 24.xi.33.

3 (M. C. Z. 41634-6) Lukungu, w. foot Mt. Elgon, U. 8.i.34.

26 (M. C. Z. 41637-69) Bukori, s. foot Mt. Elgon, K. C. 18.i.34.

Native name. *Agiar* (Karamojong, but not specific).

Measurements. The largest ♂ (M. C. Z. 41637) measures 209 (105 + 104) mm., the largest ♀ (M. C. Z. 41638) measures 249 (135 + 114) mm.

Sexual dimorphism. Before dissection, I sorted the material into two groups, viz. those with a spur and those without. Dissection demonstrated that each of the 10 spurred specimens was a male, each of the 30 devoid of spurs proved to be a female. In no instance had the original sorting to be amended or reversed. In *C. g. etiennei* Schmidt, of Banana, Belgian Congo, the male is spurless like the female.

Breeding. The testes of the males appeared to be enlarged, the ova in all thirty females was not, or only just beginning to be, enlarged.

Diet. Stomachs examined, held: (1) four half-grown praying mantids, katydid, cockroach, *Camponotus* ant, beetle, (2) three agrionid dragonflies, numerous beetles, spider, (3) remains of several agrionid dragonflies.

CHAMAELEON DILEPIS ROPERI Boulenger

Chamaeleon roperi Boulenger, 1890, Proc. Zool. Soc. London, p. 85, pl. viii, fig. 4: Kilifi, north of Mombasa, Kenya Colony.

29 (M. C. Z. 41670-98) Kibwezi, K. C. 25-30.iii.34.

2 (M. C. Z. 41699-700) Voi, K. C. 7-10.iv.34.

7 (M. C. Z. 41701-6) Mt. Mbololo, K. C. 17-27.iv.34.

Distribution. Also 14 from Sokoki Forest (H. J. A. T.) seen at Nairobi.

Native name. *Malunge* (Kitaita, but only generic).

Variation. All the males, and there are some from each locality, agree with the type in being devoid of tarsal spurs. See also remarks under *dilepis*.

Measurements. The largest ♂ (M. C. Z. 41670) measures 215 (118 + 97) mm.; the largest ♀ (M. C. Z. 41702) measures 220 (128 + 92) mm.

Breeding. Towards the end of March all the Kibwezi females appear to be gravid, one examined held 26 eggs measuring 10 mm. in diameter. A month later on Mount Mbololo, a female held 23 eggs measuring 14 x 7 mm.

Diet. Stomachs examined, held: (1) praying mantis, (2) grasshoppers.

Enemies. Roper's Chameleons were recovered from the stomach of a Lizard Buzzard (*Asturina m. monogrammica*) at Voi, a sand snake (*Psammphis biseriatus*) and two Boomslangs (*Dispholidus typus*) on Mount Mbololo.

CHAMAELEON DILEPIS QUILSENSIS Bocage

Chamaeleo dilepis var. *quilensis* Bocage, 1866, Journ. Sci. Math. Phys. Nat. Lisboa, 1, p. 59: Rio Quillo, Angola.

♂ ♂ (M. C. Z. 41707-8) Lamu Island, K. C. 7.v.34.

♂ ♀ (M. C. Z. 41709-10) Peccatoni, K. C. 24.v.34.

♀ (M. C. Z. 41711) Mapenya, K. C. 28.v.34.

♂ ♀ (M. C. Z. 41713-4) Mkonumbi, K. C. 28.v.34.

Distribution. It was a most disconcerting discovery to me to find these undoubted *quilensis* occurring in the small area about Lamu Island, for a suggested explanation see remarks under *dilepis*.

Native name. *Gegeuka* (Kiamu).

Variation. All the males agree with the type in having tarsal spurs and minute occipital lobes.

Measurements. The largest ♂ (M. C. Z. 41707) measures 200 (104 + 96) mm.; the largest ♀ (M. C. Z. 41711) measures 262 (135 + 127) mm.

Breeding. On May 28, the Mapenya female held 36 eggs measuring 9 x 8 mm., but about the same date the ova in both Peccatoni and Mkonumbi females was only slightly developed.

Diet. Stomachs examined, held: (1) grasshopper, (2) three grasshoppers, (3) three grasshoppers and a spider.

CHAMELEON DILEPIS DILEPIS Leach

Chamaeleo dilepis Leach, 1819, in Bowdich, Miss. Ashantee, App. p. 493: Gaboon.

♂ (M. C. Z. 41715) Ngatana, Tana River, K. C. 13.vi.34.

Native name. *Lumvivi* (Kipokomo, but not specific).

Variation. This male has tarsal spurs and relatively large occipital lobes.

Measurements. ♂ measures 194 (94 + 100) mm.

Discussion on status of the forms. The determination and distribution of the members of this group have given considerable trouble to taxonomists so that the records are in a chaotic state and the distribution appears even more inexplicable than is actually the case.

The key furnished by Boulenger (1887, p. 440) cannot be improved upon so far as it goes, but his species *parvilobus* has long been recognized as a synonym of *quilensis*; and *roperi* was undescribed at that time, having been long confounded with *quilensis* or with *dilepsi* in the literature.

Two points have to be borne in mind. Firstly, that it is usually impossible to distinguish very young specimens, for their lobes are insufficiently developed. Secondly, the females of *quilensis* are indistinguishable from those of *roperi* so that it is essential to collect males.

The following key will serve to separate the males:

Males without a tarsal process or spur on hind foot, occipital dermal lobes only slightly developed. *C. d. roperi*

Males with a tarsal process or spur on hind foot

Adults (and the young) with occipital dermal lobes only just movable. *C. d. quilensis*

Adults (but not young) with occipital dermal lobes well developed flaps. *C. d. dilepis*

In view of the fact that Madagascar and East Africa form the centre of distribution of the Chamaeleontidae, it is suggested as a working hypothesis to explain the somewhat anomalous distribution of these forms, that *C. d. roperi* formed the parent stock.

Its distribution, so far as we know, extends from Kilifi (its type locality) and Mombasa on the coast, inland to Kilimanjaro and north through Voi, Mount Mbololo, Mtito Andei and Kibwezi to Fort Hall, Meru and Mount Jombeni, just north of Mount Kenya. In addition, however, we must admit the occurrence of a few spurless males in a series of spurred males from Ifakara, near Mahenge, southeast Tanganyika Territory. The several Somaliland records should be rechecked.

Assuming that *quilensis* was an offshoot of *roperi*, the former must have been the dominant form over the greater part of Africa till *dilepis* developed, possibly in the Mozambique-Southwest Tanganyika-Rhodesia region where we find chameleons today with occipital lobes of intermediate size. Formerly I (1933, p. 331) referred these to *quilensis* but now consider them to be nearer to typical *dilepis* though admittedly occupying an intermediate position.

The typical form of *dilepis* appears to reach its maximum size and best development of occipital lobes in Central Tanganyika but it has pushed out westwards till it occupies the greater part of Central Africa while *quilensis* occurs on the periphery of its range.

With typical *dilepis* occurring on the Tana River between the ranges of *roperi* and *quilensis*, and with *quilensis* and *roperi* persisting in the Iringa-Ifakara country, it seems quite possible that the study of more extensive material may show the position to be even more involved than appears at present. At some not too distant date I hope to investigate and revise all the East African records in the literature.

CHAMAELEON BITAENIATUS BITAENIATUS Fischer

(Plate 9, fig. 1)

Chamaeleo bitaeniatus Fischer, 1884, Jahrb. Hamb. Wiss. Anst., 1, p. 23, pl. ii, fig. 7: Masailand, East Africa.

7 (M. C. Z. 41715-21) Bukori, K. C. 18.i.34.

52 (M. C. Z. 41722-50) Kaimosi, K. C. 7-28.ii.34.

Native name. *Invambu* (Luragoli and Lutereki).

Measurements. The largest ♂ (M. C. Z. 41744) measures 143 (78 + 65) mm., the largest ♀ (M. C. Z. 41724) measures 148 (92 + 56) mm.

Breeding. On January 18, at Bukori, all six females were gravid with spherical eggs, these numbered 11, 12, 13, 16, 17 and 20 respectively and all were about 7 mm. in diameter. In mid-February at Kaimosi, most females appeared gravid with eggs bearing well-formed embryos, one lot numbered 13 eggs measuring 9 x 10 mm.

Diet. Stomachs examined held: (1) flies and a stick insect, (2) flies and a caterpillar.

Enemies. Four of these chameleons were recovered from the stomachs of three Boomslangs (*Dispholidus typus*) at Kaimosi. On February 25, as I was standing beneath a very tall tree in camp, two adult male chameleons fell fighting at my feet. They were green as they landed, turned very dark, separated, then hastily strode to the trunk of the tree and reascended its rough bark. Two chameleons from this locality had truncated tails, one a mere stump.

CHAMAELEON BITAENIATUS HÖHNELII Steindachner

(Plate 9, fig. 2)

Chamaeleon höhnelii Steindachner, 1891, Sitzber. Akad. Wiss. Wien, 100, part 1, p. 309, pl. i, fig. 2: Laikipia, Kenya Colony.

52 (M. C. Z. 41751-69) Sipi, U. 12-24.xii.33.

1 (M. C. Z. 41770) Bulambuli, U. 4.i.34.

59 (M. C. Z. 41771-95) Butandiga, U. 5-15.i.34.

4 (M. C. Z. 41796-9) Budadiri, U. 17.i.34.

2 (M. C. Z. 41800) Elgonyi, K. C. 25.i.34.

Distribution. The first four of these localities are on western Elgon between 4,000 and 9,000 feet, the last on the southern slope at about 6,000 feet.

Native name. *Ikanyafu* (Lugishu).

Measurements. The largest ♂ (M. C. Z. 41754) measures 199 (100 + 99) mm., the largest ♀ (M. C. Z. 41751) measures 190 (100 + 90) mm.; the smallest only 86 (48 + 38) mm., except for one mentioned below.

Breeding. From December 12 to January 17, almost all females held 9 to 22 eggs, or embryos, according to the size of the mother. A few held eggs only 8 mm. in diameter, but the majority consisted of large, irregular-shaped membranes containing embryos many of which had little yolk left. On January 25, at Elgonyi, a native brought in the first newly born chameleon which we had seen, it measured only 45 (25 + 20) mm.

Diet. Stomachs examined held: (1) ants, beetle, hemipteron, (2) ants, beetles, cockroach, flies, (3) flies, (4) flies and a large piece of its own scarf epidermis.

Enemies. Höhnel's Chameleons were recovered from the stomachs of four green snakes (*Chlorophis hoplogaster*) at Sipi and Butandiga, also from a Boomslang (*Dispholidus typus*) at Sipi.

CHAMAELEON BITAENIATUS ALTAELGONIS Loveridge

Chamaeleon bitaeniatu altaelgonis Loveridge, 1935, Bull. Mus. Comp. Zool., 79, p. 15: Kaburomi, 10,500 feet, Mt. Elgon, Uganda.

52 (M. C. Z. 40274-40300) Kaburomi, U. 27-28.xii.33.

2 (M. C. Z. 41801-2) Madangi, U. 3-4.i.34.

Remarks. As might be expected, this dwarf, montane race from the alpine zone of Mount Elgon, produces fewer eggs than does its larger relative, *C. b. höhnelii*, which occurs lower down the same mountain from 5,000 to 7,000 feet.

Breeding. On December 28, ten of the thirty females in the type series were examined and found to be gravid with 5, 6, 6, 7, 7, 8, 9, 9, and 10 ova of which the smallest measured 7 mm. diameter, in nine females the embryos were in various stages of development, one lot quite ready for birth.

Diet. Ten stomachs examined all held finely masticated little flies and beetles, other identifiable material was: (1) cricket, (2) cricket, grasshopper, froghopper, and (3) caterpillar.

Parasites. Nematodes (*Strongyluris* ? *media*) were abundant in the intestines of the type series.

Enemies. Elgon Chameleons were twice recovered from the stomachs of Augur Buzzards (*Buteo r. augur*) at Kaburomi, one bird held four.

CHAMAELEON FISCHERI TAVETENSIS Steindachner

Chamaeleon tavetensis Steindachner, 1891, Sitzber. Akad. Wiss. Wien, **100**, part 1, p. 310, pl. i, figs. 3-3a: Taveta Forest, south foot of Kilimanjaro, Tanganyika Territory.

Chamaeleo abbotti Stejneger, 1891, Proc. U. S. Nat. Mus., **14**, p. 353, text fig.: At 4,600 feet, Kilimanjaro, Tanganyika Territory.

♂ ♀ (M. C. Z. 41863-4) Mt. Mbololo, K. C. 17.iv.34.

Distribution. To the best of my knowledge, this species has not previously been taken in the Taita Mountains, the name "*taitensis* Steindachner" used by Stejneger (1893, p. 724) and again by Tornier (1896, p. 57) is a nomen nudum substituted for *tavetensis*.

Affinities. From its geographical position between the Nguru mountains (type locality of *fischeri*) and Meru, Mt. Kenya (type locality of *C. f. excubitor*), this small form should be regarded as a race of *fischeri*.

Native name. *Malunge* (Kitaita, but generic).

Measurements. The ♂ measures 143 (4 + 62 + 77) mm. from end of the 4 mm. horns; the ♀ measures 121 (56 + 65) mm.

Breeding. On April 17, the female held 4 spherical ova 6 mm. in diameter.

Diet. Stomachs examined, held: (1) beetle and small grasshopper, (2) weevil, membracid, hemipteron, muscid fly and an ant.

BROOKESIA KERSTENII KERSTENII (Peters)

Chamaeleo kerstenii Peters, 1868, Monatsb. Akad. Wiss. Berlin, p. 449: Wanga (i.e. Vanga), near Mombasa, Kenya Colony.

♀ (M. C. Z. 41805) Voi, K. C. 10.iv.34.

♀ (M. C. Z. 41806) Mt. Mbololo, K. C. 24.iv.34.

♂ (M. C. Z. 41807) Witu, K. C. 31.v.34.

♀ (M. C. Z. 41808) Ngatana, K. C. 12.vi.34.

Native name. *Lumvivi* (Kipokomo, but not specific).

Coloration in life. The broad rim round the inner aspect of both upper and lower jaws was bright orange in the large female from Ngatana.

Measurements. The ♂ measures 59 (37 + 22) mm.; the largest ♀ (M. C. Z. 41808) measures 79 (55 + 24) mm.

Breeding. On April 24, on Mbololo, a female held 3 eggs about 3.5 mm. in diameter; on June 12, at Ngatana, about 6 of the ova were slightly developed to 2 mm. diameter.

Diet. Stomachs examined, held: (1) two grasshoppers, (2) grasshopper and spider, (3) two ants.

BIBLIOGRAPHY

AHL, ERNST

1933. "Zur Kenntnis der afrikanischen Wühlschlangen der Gattung *Eryx*." Sitz. Ges. naturf. Freunde Berlin, pp. 324-326, figs.

ANDERSON, JOHN

1898. "Zoölogy of Egypt, 1, Reptilia and Batrachia." London.

BARBOUR, THOMAS and LOVERIDGE, ARTHUR

1928. "A Comparative Study of the Herpetological Fauna of the Uluguru and Usambara Mountains, Tanganyika Territory, with Descriptions of new Species." Mem. Mus. Comp. Zoöl., 50, pp. 87-265, pls. i-iv.

BOULENGER, G. A.

1887. "Catalogue of Lizards in the British Museum (Natural History)." Ed. 2, 3, London.
1893. "Catalogue of Snakes in the British Museum (Natural History)." 1. London.
1894. "Catalogue of Snakes in the British Museum (Natural History)." 2. London.
1896. "Catalogue of Snakes in the British Museum (Natural History)." 3. London.
1921. "Monograph of the Lacertidae." 2. London.

FLOWER, S. G.

1933. "Notes on the recent Reptiles and Amphibians of Egypt, with a list of the species recorded from that Kingdom." Proc. Zoöl. Soc. London, pp. 735-851, map.

HEWITT, JOHN

1935. "Some new forms of Batrachians and Reptiles from South Africa." Rec. Albany Museum. Grahamstown. pp. 283-357, pls. xxvii-xxxvi.

LÖNNBERG, EINAR

1922. "Sammlungen der schwedischen Elgon-Expedition im Jahre 1920. 6. Reptiles." Arkiv Zoöl., Stockholm, 14, No. 12, pp. 1-8.

LOVERIDGE, ARTHUR

1916. "Report on the Collection of Ophidia in the Society's Museum." Journ. East Africa and Uganda Nat. Hist. Soc., 5, pp. 77-87.
1923. "Notes on East African Lizards collected 1920-1923, with the description of two new races of *Agama lionotus* Boulenger." Proc. Zoöl. Soc. London, pp. 935-969.

1929. "East African Reptiles and Amphibians in the United States National Museum." Bull. U. S. Nat. Mus., No. 151, pp. 1-135, pl. i.
1933. "Reports on the Scientific Results of an Expedition to the South-western Highlands of Tanganyika Territory. VII. Herpetology." Bull. Mus. Comp. Zoöl., **74**, pp. 197-416, pls. i-iii.

NIEDEN, FRITZ

1913. "Neues Verzeichnis der Kriechtiere (ausser den Schlangen) von Deutsch-Ostafrika. I. Reptilia." Mitt. Zoöl. Mus. Berlin, **7**, pp. 51-100.

PERACCA, M. G.

1909. in Abruzzi, "Spedizione al Ruwenzori di S. A. R. il Principe L. Amedeo di Savoia. Rettili ed Anfibi", **1**, pp. 165-180. Milan.

SCHMIDT, K. P.

1923. "Contributions to the Herpetology of the Belgian Congo based on the Collection of the American Museum Congo Expedition, 1909-1915. Part II.—Snakes." Bull. Amer. Mus. Nat. Hist., **49**, pp. 1-146, pls. i-xxii.

STEJNEGER, LEONARD

1893. "On some Collections of Reptiles and Batrachians from East Africa and the adjacent Islands, recently received from Dr. W. L. Abbott and Mr. William Astor Chanler, with Descriptions of New Species." Proc. U. S. Nat. Mus., **16**, pp. 711-741.

TORNIER, GUSTAV

1896. Die Reptilien und Amphibien Ost-Afrikas. In Deutsch-Ost-Afrika, **3**, Lief. iii-iv.

EXPLANATION OF PLATES

PLATE 1

PLATE 1

FIG. 1. BABCOCK'S LEOPARD TORTOISE (*Testudo pardalis babcocki*).

Ventral aspect of Type ♀ (M. C. Z. 40,003) from Mount Debasien. On ordinary ground these fine tortoises soon right themselves by setting up an oscillatory motion. Occasionally, however, one finds the remains of an individual which has lost its balance among rocks, and in consequence met with a miserable death.

FIG. 2. BABCOCK'S LEOPARD TORTOISE (*Testudo pardalis babcocki*).

This species is often called the mountain tortoise on account of the preference which it exhibits for rocky, hilly country. The race is characterized by the highly vaulted carapace when contrasted with the more depressed shell of the typical form from southwest Africa.



1



2

PLATE 2

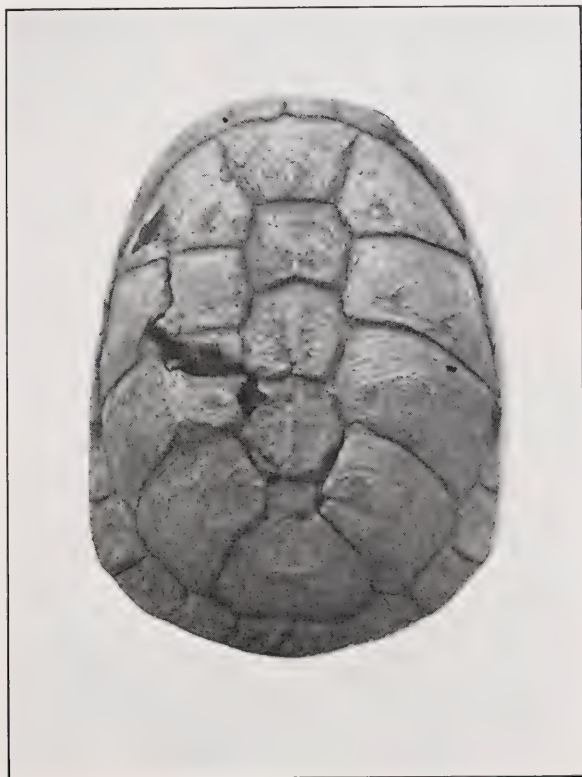
PLATE 2

FIG. 1. BLACK TERRAPIN (*Pelusios nigricans nigricans*).

One of several from Kaimosi, Kakamega, Kenya Colony, whose carapace and plastron exhibit severe injuries, presumably resulting from the unsuccessful attack of a powerful-jawed carnivore, such as a hyena. Apparently, however, the injury had not impaired the health of the water tortoise.

FIG. 2. VENTRAL VIEW OF A BLACK TERRAPIN FROM KAIMOSI.

In Tropical Africa, during the prolonged dry season, many of the semi-aquatic tortoises bury, and become imprisoned, in mud. They are released by the first torrential downpour of the 'big rains' and set forth still plastered with mud, as is the figured specimen, in search of suitable stagnant water.



1



2

PLATE 3

PLATE 3

FIG. 1. A BROWN HOUSE SNAKE (*Boaedon lineatus*) AT KAIMOSI.

More often black when adult, this species owes its name in part to the frequency with which it is found about dwellings, where it is often killed under the impression that it is a "young black mamba." Actually it visits houses in search of rodents; the thirty-eight inch specimen figured, had swallowed a black rat which measured seven and a half inches from the tip of its snout to the root of its tail.

FIG. 2. CAPE WOLF SNAKE (*Lycophidion capense capense*).

The wolf snakes have been so-named on account of their teeth, but, like the house snakes, they are non-poisonous and deserve protection on account of their diet, which, in the more slender wolf snakes, consists very largely of mice, though lizards and even other snakes are sometimes eaten.



1



2

PLATE 4

PLATE 4

FIG. 1. AN EGG-EATING SNAKE (*Dasypeltis scaber*) AT SIPI.

This reptile subsists entirely on eggs, chiefly those of small birds, but also of game birds. A hen's egg has been placed in the mouth of this specimen to demonstrate the remarkable, though normal, distension of the gape. As its teeth are vestigial, the snake effects the breaking of the egg only when it reaches the gullet, at which point certain specialized hypophyses of the vertebrae fracture the shell; in this way none of the contents are lost.

FIG. 2. EASTERN JAMESON'S MAMBA (*Dendraspis j. kaimosae*).

One of the type series from Kaimosi. This new form is characterized by its uniformly black tail and lower subcaudal count. The specimen photographed shot through the spokes of a native's cycle, became wedged in the forks, and was brought into camp alive. Mambas are the most poisonous of all African snakes.



1



2

PLATE 5

PLATE 5

FIG. 1. PUFF ADDER (*Bitis arietans*) STRIKING AT THE PHOTOGRAPHER.

This photograph is chiefly interesting as showing how very little of even so heavy-bodied a species as a Puff Adder, remains on the ground when a snake strikes. The camera used, a Baby Rolleiflex, necessitated the operator crouching within three feet of the subject. After several successful exposures had been made, the snake, which had been growing more and more irate, launched itself at the photographer's face at a moment when she was preoccupied with the view finder. Sudden and unexpected as was the attack, the author's stick, to be seen in the photo, was just in time to intercept the snake when only a few inches from her face.

FIG. 2. RHINOCEROS VIPER (*Bitis nasicornis*) AT KAIMOSI, KAKAMEGA.

These beautiful though deadly reptiles are excessively abundant in this locality, where they attain a length of forty inches. They feed upon shrews, mice and toads, and are themselves preyed upon by civets and the white-tailed mongoose. As many as forty-five young are produced at a birth.



1



2

PLATE 6

PLATE 6

FIG. 1. A RAIN-FOREST GECKO (*Cnemaspis africanus elgonensis*).

This photograph is of the Kaimosi specimen which was not wholly typical of the new race discovered on Mount Elgon. Each female lays two hard-shelled eggs in cavities of rotting wood, hollow trees, or beneath logs. The young emerge in mid-December. These geckos feed upon crickets as well as smaller insects, while they themselves are preyed upon by green snakes (*Chlorophis hoplogaster*).

FIG. 2. THE ROCK-DWELLING ELGON AGAMA (*Agama agama elgonis*).

These gorgeous, red-headed lizards, with backs of dark blue spotted with lighter and tails alternately banded with the same shades, bask upon, or dash about, the rocky outcrops of the mountain. The photograph, taken at Sipi, is of an adult male. Ants and termites furnish them with their principal food. The race acts as host to numerous nematodes.



1



2

PLATE 7

PLATE 7

FIG. 1. ALLEN'S MONTANE LIZARD (*Algiroides alleni* BARBOUR).

This interesting inhabitant of the alpine zone of Mount Elgon, from whence it is now recorded for the first time, was discovered by Dr. G. M. Allen on Mount Kenya, later it was found on Mount Kinangop. The large series obtained at Kaburomi, 10,500 feet, provides useful data as to variation, diet and parasites.

FIG. 2. A SKINK (*Riopa anchietae*) WITH RUDIMENTARY LIMBS.

This Angolan lizard reaches its northeasterly limits at Kaimosi in Kenya, where this photograph was taken. The young are apparently born in March when from four to eight are produced. These defenceless creatures, frequently killed in mistake for snakes, feed upon grasshoppers, weevils, caterpillars and the like.



1



2

PLATE 8

PLATE 8

FIG. 1. A VARIABLE SKINK (*Mabuya varia varia*) FROM ELGON.

Probably the only African lizard which ranges from sea level to 12,000 feet, where it is abundant among the heather-like tussocks of the alpine zone. Many fall victims to birds of prey; no fewer than five of these skinks were recovered from the stomach of a single Augur Buzzard (*Buteo r. augur*), another from a migrant Kestrel (*Falco t. tinnunculus*). Photographed at Kaburomi.

FIG. 2. IRREGULAR SKINK (*Mabuya irregularis*) ON MOUNT ELGON.

Another inhabitant of the alpine zone at Kaburomi, now recorded from this mountain, as well as from Uganda, for the first time. Taken in December, this gravid female held five young almost ready for birth. She had recently eaten a weevil, caterpillar and two spiders, which shared her stomach with parasitic nematodes (*Thunbunaea asymmetrica*).



1



2

PLATE 9

PLATE 9

FIG. 1. A NEW-BORN CHAMELEON (*Chamaeleon b. bitaeniatus*).

Unlike many other species of the genus which are hatched from eggs, the young of *bitaeniatus* are born alive in batches of from eleven to twenty. At Kaimosi this takes place apparently in March when the rainy season commences. The little reptile is grasping a coin the size of a quarter.

FIG. 2. VON HÖHNEL'S CHAMELEON (*Chamaeleon b. höhnelii*).

These bearded chameleons were photographed at Butandiga, 7,000 feet, on western Elgon, Uganda. At this locality and nearby Sipi, four green snakes (*Chlorophis hoplogaster*) and Boomslang (*Dispholidus typus*) were found to have fed upon these creatures. It is obvious that something is instrumental in reducing their numbers for they are very prolific, from nine to twenty-two being produced at a birth.



1



2



Bulletin of the Museum of Comparative Zoölogy

AT HARVARD COLLEGE

VOL. LXXIX, No. 6

SCIENTIFIC RESULTS OF AN EXPEDITION
TO RAIN FOREST REGIONS IN EASTERN AFRICA

VI

NEMATODA

BY J. H. SANDGROUND

CAMBRIDGE, MASS., U. S. A.

PRINTED FOR THE MUSEUM

NOVEMBER, 1936

No. 6. — *Reports on the Scientific Results of an Expedition to the
Rain Forest Regions in Eastern Africa*

VI

Nematoda

BY J. H. SANDGROUND

In the course of his 1933-1934 expedition to Kenya Colony and Uganda, as a Fellow of the Guggenheim Memorial Foundation, Mr. Arthur Loveridge collected a small quantity of helminthological material. Subsequently in the course of making a systematic study of the food habits of the many reptiles collected, Mr. Loveridge has encountered many other instances of parasitism. Where parasites uncovered in this way have proved of special interest, it has been possible to examine the alimentary tracts of a large series of alcohol or formalin preserved hosts and in this way to secure a much more useful collection than could be obtained in the field. Although some of the worms collected many months after their death are not preserved in as effective a manner as they might have been if secured alive, most of them are still suitable for study. This method of gathering nematodes has the special advantage of permitting a very thorough inspection of the gut contents. As a result, the taxonomically all-important males, elusive because of their minute size and relative rarity, can usually be detected.

A new genus and several new species of nematodes are described in this paper. The collection also contained a number of forms that have been previously observed and described. Only in one instance (see p. 361 of this paper) is their occurrence in a new host or locality deemed of sufficient helminthological interest to warrant a special account; however, these new records are incorporated in Mr. Loveridge's herpetological papers, under the caption "parasites."

The type material of the new species described in this paper are deposited in the Helminthological Collection of the Museum.

SPIRUROIDEA

PARASPIRURA MABUYAE gen. et sp. nov.

Host: *Mabuya brevicollis* Wiegmann.

Location: Stomach (free in lumen).

Locality: Kibwezi or Tsavo, Kenya Colony.

This worm is represented by 9 male and 12 female specimens. The translucent white body is fairly straight in the preserved state, tapering gradually towards the extremities, and relatively slender. Cuticular striae conspicuous, $4\ \mu$ apart. The head, about $60\ \mu$ wide, is not set off from the rest of the body by a constriction or inflation of the cuticle. Two small, simple, lateral lips or pseudolabia, each bearing towards its

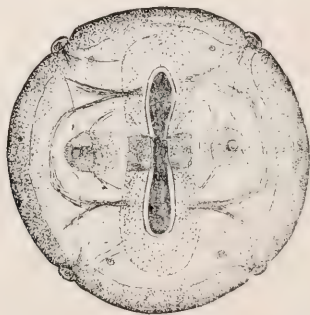


Fig. 1. *Paraspirura mabuyae*. Frontal view of head.

base two pairs of papillae of which the inner are minute, the outer fairly large and prominent; in addition, somewhat anterior to the papillae in the median field of each lip is a relatively large circular amphid. Cuticular elevations in the form of narrow membranous shields (? interlabia) form a bridge between the lips dorsally and ventrally. On the internal face of each lip near its apex is a minute tooth-like projection, and behind this is a serrated edge that recalls the denticular ridges of some species of *Abreviata*. From the frontal view (Fig. 1) the oral aperture is seen to be dorso-ventrally elongated with a pronounced constriction in the middle. The lips are not superficially lobed though lateral and dorsal views of the head (Figs. 2 and 3) show grooves and cuticular flanges on their internal faces.

Buccal cavity cylindrical, 45 to $55\ \mu$ long and about $30\ \mu$ wide, with delicate, lightly cuticularized walls.

Cervical papillae acicular, symmetrical, located in front of nerve ring which encircles the middle of the muscular part of oesophagus. Excretory pore conspicuous, about 0.10 mm. behind nerve ring.

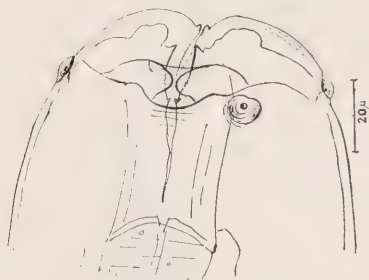


Fig. 2. *Paraspirura mabuyae*. Dorso-ventral optical section.

Male. Length 12.6 to 11 mm., maximum width near equator 0.33 to 0.37 mm. Total length of oesophagus 4.03 to 5.2 mm., of which the anterior muscular part measures 0.23 to 0.27 mm. Caudal alae wide,

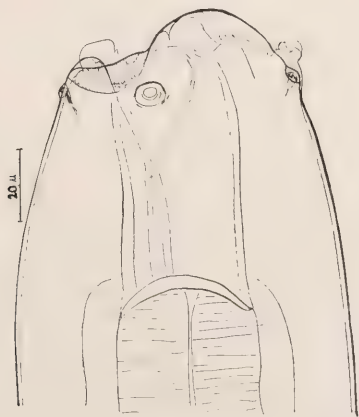


Fig. 3. *Paraspirura mabuyae*. Lateral optical section.

becoming confluent with body contour about 0.2 mm. in front of cloaca and extending posteriorly to tip of tail. Cuticle on venter ornamented with a delicate pattern of linear and small tessellated markings.

Cloacal aperture salient, and large. Tail 0.23 to 0.25 mm. long. There are four pairs of lateral stalked papillae equidistantly spaced in front of anus. A median papilla with relatively large end-organ is found on the anterior rim of the cloaca. Post-anally there are five pairs of papillae: the first pair are sessile and situated towards the median line; a larger pair of stalked papillae near the middle of the tail; between the

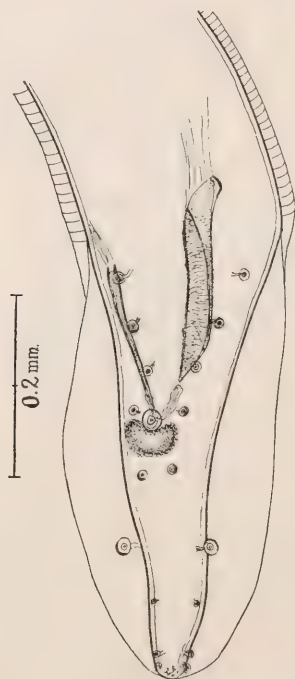


Fig. 4. *Paraspirura mabuyae*. Tail of male; ventral view. The cuticular ornamentation is not represented in the figure.

last mentioned and the tip of the tail is a pair of very small lateral sessile papillae; adorning the tip of the tail are two pairs of lateral papillae with short peduncles in addition to the minute pores of the caudal glands. Spicules unequal and dissimilar; left spicule is the more robust and measures 0.23 to 0.24 mm. and about 0.035 mm. wide in the middle of the shaft; it is superficially marked with strong irregular lines. Right spicule thinner, more lightly cuticularized, measures

0.16 to 0.18 mm. by 0.015 mm. broad. Gubernaculum, apparently v shaped or triangular in ventral view, measures about 0.060 mm. but lightly cuticularized and consequently difficult to define.

Female. Length 17 to 21 mm.; maximum width 0.40 mm. Muscular oesophagus 0.35 to 0.37 mm.; glandular oesophagus 4.3 to 5.4 mm. Body tapers posteriorly to form a gracefully curved tail with rounded end provided with two minute spike-like papillae. Anus slightly

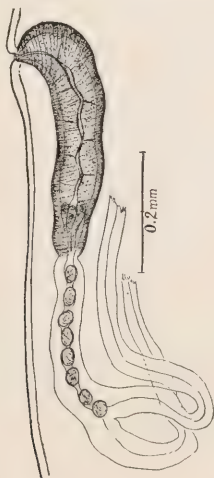


Fig. 5. *Paraspirura mabuyae*. Female genitalia from dissection.

salient, 0.37 to 0.41 mm. from extremity. Vulva with slightly tumid lips situated at the beginning of the posterior third or fourth of the body, 4.1 to 6.3 mm. from the extremity. Vagina directed posteriorly. Ovejector thick-walled, 0.4 mm. long, continues into a short (0.25 mm.) so-called common trunk formed from the union of the two uteri which soon bend antieriad then diverge to run in opposite directions. Eggs rounded oval, with thick smooth shells averaging $42\ \mu$ by $33\ \mu$; embryonated when discharged.

SYSTEMATIC POSITION

If, in spite of the practical difficulties that may be connected therewith, we regard the nature of the buccal cavity and the structure of the

lips with their associated sense organs as representing the characters of primary taxonomic significance, and we employ the key to the families of Spiruroidea which Chitwood and Wehr (1934, p. 312) have constructed chiefly on the basis of cephalic structures, the species described above must be classified among the Spiruridae. On further investigation it is found that the species shows closest affinity with either the Spirurinae (Railliet, 1916) or the Habronematinae Chitwood and Wehr, 1934, depending upon whether we are to interpret the narrow flange-like membranes that connect the lips in the dorsal and ventral fields as interlabia.

With the exception of *Hedruris*, whose relationship with the present form is evidently a distant one, there is no genus in the Spiruridae with representatives recorded in reptiles. Leaving out of consideration the difficult question of the interlabia, I am inclined to attribute our species to the Spirurinae chiefly on account of several similarities that it has with certain species of *Spirura*. Thus, the constriction of the oral rim is comparable with that of *S. rytiplerites* (cf. Chitwood and Wehr, 1934, p. 297) and *S. michiganensis* Sandground, 1934, and the structure of the female genitalia and male caudal extremity is very similar to that described for *S. talpae* by Stefanski (1934).

Our species must, however, be generically differentiated from *Spirura* on account of the absence of labial lobes, the presence of labial teeth and the shape of the buccal cavity.

PARASPIRURA gen. nov.

Spiruridae. Two small lateral lips each bearing two pairs of papillae submedially towards the base and a larger circular amphid in the median line. Minute apical tooth and dentigerous ridges on inner labial face; membranous flanges (? interlabia) between the lips. Mouth dorso-ventrally elongated. Buccal vestibule cylindrical with lightly cuticularized walls. Oesophagus plainly divided into muscular and glandular parts. Male with wide caudal alae and cuticular ornamentations on ventral surface. Four pairs pedunculate and a single median preanal papillae; five pairs postanal papillae. Spicules unequal and dissimilar. Gubernaculum present. Vulva post-equatorial; Oviparous.

Type species *P. mabuyae* in Lacertilia.

ABREVIATA (POLYDELPHYOPTERA) POICILOMETRA sp. nov.

Host: *Cercopithecus mitis kibonotensis* Lönnberg.

Locality: Ngatana, Kenya Colony.

The material consists of four females and a single male, robust in form with slight attenuation towards the truncated head and a more sharply pointed tail. Delicate, transversely striated cuticle loosely wrinkled in cephalic region where it may be partially or wholly reflected over the lips. Labial armature of denticles similar to that described by Ortlepp (1926) for *Physaloptera caucasica*, consisting of a

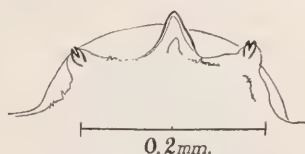


Fig. 6. *Abreviata* (P.) *poicilometra*. Inner face of a lip.

prominent triangular apical tooth with a single small membranous structure projecting from its internal base, two split or chela-like teeth on submedian edge, and several denticular ridges on the inner face visible only on separating the lips. (Fig. 6.)

Measurements of *A. poicilometra* in millimeters.

| | Male | Female |
|-----------------------------------|------|-----------------------|
| Length | 35 | 38-63. |
| Equatorial width | 1.4 | 1.6 |
| Cervical papillae from antr. end. | 0.58 | 0.7 |
| Glandular oesophagus | 0.4 | 0.4 |
| Muscular oesophagus | 4.4 | 6.0 |
| Tail | 1.9 | 1.5 |
| Vulva to antr. end. | | 10.3 |
| Eggs | | 0.049 x 0.038 average |

FEMALE GENITAL SYSTEM

Vulva inconspicuous externally. There is a long, narrow vagina which gradually dilates into a spindle-shaped egg-chamber which, at its broadest point, measures 0.37 mm. The posterior end of the egg chamber again narrows to form the so-called common trunk, which receives the uteri. In three specimens that were dissected, the number

of uteri as well as their mode of union with the common trunk showed the following variations: In the longest female (63 mm.) there were ten uteri arising by irregular dichotomy, six uterine branches uniting in pairs to form one arm of the common trunk, and four uterine branches pairing up to form the second arm. (Fig. 7B.) In the second

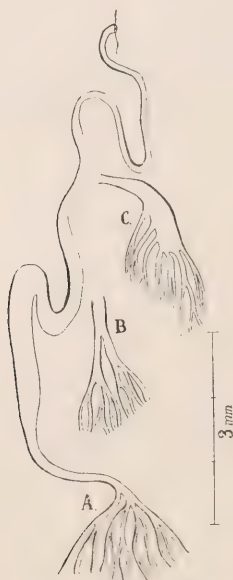


Fig. 7. *Abreviata* (P.) *poecilometra*. Dissections of the genitalia of three females showing variation in the number and mode of union of the uteri with the common trunk.

specimen (Fig. 7A) the genitalia consisted of 13 uteri, the common trunk first giving off an arm that divides into 3 branches and further back the other arm splits into three very short branches, of which the inner divides dichotomously into 4 uteri while the remaining two each give rise to three uteri. In the smallest example of the species (38 mm.) the individual uteri were intertwined in a manner which did not permit determination of their exact number. There were certainly more than 14 uterine tubes uniting by twos and threes to form seven arms which individually emptied into the base of the common trunk as shown in figure 7C.

MALE GENITAL SYSTEM

The "bursa" is lanceolate in shape, measuring 2.3 mm. in length and 1.2 mm. at its widest point. Its ventral surface shows the usual cuticular ornamentation. The long stalked lateral papillae are arranged in pairs in front of and behind the anus. Three sessile papillae



Fig. 8. *Abreviata* (P.) *poecilometra*. Caudal extremity of male from ventral aspect.

arranged at the points of a triangle mesially in front of the anus. Two median, sessile pairs of papillae immediately post-anal. Four pairs of lateral papillae with short peduncles behind the anus in positions illustrated in figure 8. Spicules unequal and dissimilar: left thin and flexible measures 2.8 mm. in length; the right is of more substantial structure but as it was partially extruded it was not in a favorable position for measurement; approximately its length is around 0.3 mm.

SYSTEMATIC POSITION

As it was defined and treated in the comprehensive revision by Ortlepp (1922), the genus *Physaloptera* Rudolphi was one of the largest and taxonomically one of the most unwieldy of the genera of parasitic

nematodes. Many of the better known species in the genus are known to display great ranges of variation effecting many of the criteria that have been utilized for specific differentiation. Even though Ortlepp reduced many of the species to synonymy, there can be no doubt that many ill-differentiated species are still retained in the catalogue. A critical revision of the group, undertaken as soon as information on developmental morphology secured from cross-infection life-history experiments is available, will probably reveal that many species erected mainly on the basis of host occurrence should be eliminated. Although it was not undertaken with a view to eliminating the spurious species that have accumulated, the most valuable of recent contributions to the taxonomy of the Physalopteridae is that of Schulz (1927) which, being published in Russian in a not often available "Festschrift," has not received the attention it merits. To subdivide and regroup the species of Physaloptera (s.l) Schulz has employed a so-called Principle of Taxonomic Co-efficients, a device which apparently loses nothing because of its purely pragmatic purpose. The genus is divided primarily on the dentation of the lips into three genera, each of which is secondarily separated into subgenera on the basis of the uterine branching in the female.

Classified on the basis presented by Schulz, the species described in the present paper will be assigned to the genus *Abreviata* (Travassos) emend Schulz, which is characterized by the presence of an apical tooth, dorsal and ventral submedian teeth, and with or without denticular ridges on the internal face of the lips. It will further be placed in the subgenus *Polydelphyoptera* on account of its multiple uteri. Schulz assigned only one species, *A.(P). capensis* Ortlepp, 1922 from the South African rodent, *Xerus capensis*, to this subgenus. A questionable second species of the subgenus is *Physaloptera joyeuxi* Gendré, 1928 from *Phacochoerus africanus*. Our species is also to be assigned here. The outstanding differential feature in the male is its sixth pair of post-anal papillae, other species usually carrying only five pairs. The most interesting feature of the species is the surprising variation displayed in the number and mode of origin of the uteri. In the first specimen dissected (Fig. 7 A) the uteri are identical with that described for *A.(P). capensis*; the uterine complex in the second and third of our dissected specimens appears to be unique among polydelphous forms thus far described among species of the group.

STRONGYLOIDEA

OSWALDOCRUZIA LOVERIDGEI spec. nov.

Host: *Siaphos kilimensis* Stejneger (Scincidae).

Locality: Mt. Mbololo, Taita, Kenya.

The range of measurements of the 8 male and 4 female worms, taken from the stomachs of 3 of 5 specimens of the host examined, are as follows:

| | Male | Female |
|---------------------------|-----------|---------------------------|
| Length | 3.5-4.1 | 5.9-7.5 |
| Maximum breadth | 0.08-0.09 | 0.1-0.15 |
| Antr. end to nerve ring | 0.15-0.16 | 0.19-0.21 |
| Antr. end to excret. pore | 0.19-0.25 | 0.26-0.28 |
| Length of oesophagus | 0.27-0.30 | 0.36-0.38 |
| Length of tail | | 0.23-0.25 |
| Length of spicules | 0.19 | |
| Head to vulva. | | 4.84-4.9 |
| Size of eggs in uteri | | 76-84 μ x 42-48 μ |

The specimens are well extended but the state of preservation of some specimens is not all that can be desired. Perhaps for this reason considerable differences are observed in the cuticular inflation of the

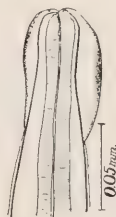


Fig. 9. *Oswaldocruzia loveridgei*. Anterior extremity of a male with maximum development of cephalic inflation.

cephalic region. In some worms this inflation is hardly perceptible while in others it is conspicuous and extends for 65μ to 70μ in both sexes. In several specimens the cuticle, including that of the cephalic inflation, is devoid of cross striations or other markings; in others a faint striation is to be seen. Occasionally the cephalic inflation is uniformly marked with fine or coarse granulations (Fig. 9). Variations

in the appearance of this structure consequently appear to be of little taxonomic significance.

Narrow lateral alae may be found in the anterior portions of the body in both sexes. Cervical papillae, and in the male, prebursal papillae were not observed.

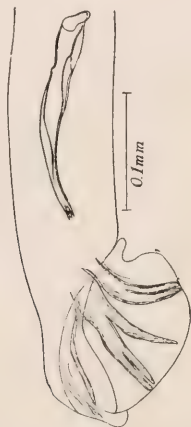


Fig. 10. *Oswaldocruzia loveridgei*. Lateral view of caudal region of male.

As illustrated in Fig. 10, the arrangement and form of the bursal rays are characteristic of the genus, but the terminal digitations of the dorsal ray, identical in all specimens examined, appears to be distinctive of the species. The golden yellow spicules are about 15μ wide in the middle and are split distally into 4 splinter-like processes which spread out like the ribs of an open fan (Fig. 13) when the spicule is partially extruded from the cloaca.

No special peculiarities were found in the females.

Although the records do not indicate that members of this genus display any high degree of host specificity, few of the fourteen or more presumably distinguishable species of *Oswaldocruzia* have been described from reptiles. Among these are *O. agamae* Sandground, 1929, *O. malayana* Baylis 1933 and *O. brasiliensis* Lent and Freitas, 1935. The present species seems to show the closest resemblance to *O. brasiliensis*, recently described from a Brazilian snake, *Drymobius bifossatus*. This is especially true when size is considered, but since con-

siderable differences in size may be expected in the same species associated with different hosts (Harwood, 1932) little stress is to be attributed to the fact that the species here described is among the



Fig. 11. *Oswaldocruzia loveridgei*. Terminal digitation of dorsal ray; highly magnified.



Fig. 12. *Oswaldocruzia loveridgei*. Spicule in its sheath drawn from dorsal aspect.



Fig. 13. *Oswaldocruzia loveridgei*. Extremity of exserted spicule; highly magnified.

smallest thus far recorded in the genus. The view that the species is new is based more on a consideration of the form of the spicules and the terminal branching of the dorsal ray.

OXYUROIDEA

PHARYNGODON MABUYAE sp. nov.

Host: *Mabuya varia varia*.

Location: rectum.

Locality: Mt. Elgon, Uganda.

This species, comprising some thirty male and female specimens, was found in two of three examinations of the host. As the following

table of measurements will show, the species is somewhat larger than those previously described in the genus. In all features, other than those mentioned below, our form closely resembles *Pharyngodon laevicauda* as described by Seurat (1914), but after having been com-



Fig. 14. *Pharyngodon mabuyae*. Male viewed from ventral aspect.

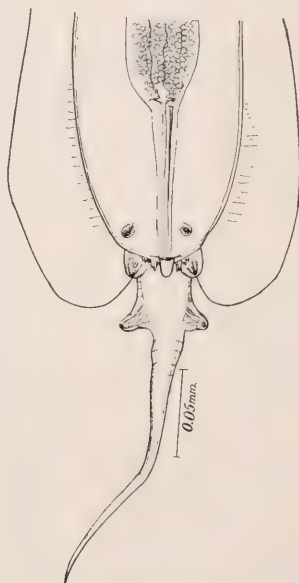


Fig. 15. *Pharyngodon mabuyae*. Caudal extremity of male from ventral aspect under higher magnification.

pared with the descriptions of all the species recognized by Spaul (1926) and the four species that have subsequently been added to the genus, it is believed to represent a distinctly new species.

Measurements in millimeters

| | Female | Male |
|--------------------------------------|-----------|-----------|
| Length | 6.6-7.1 | 2.0-2.3 |
| Maximum width | 0.465 | 0.25 |
| Length of oesophagus including bulb. | 0.65-0.69 | 0.43-0.46 |
| Antr. end to nerve ring | 0.46-0.5 | 0.34 |

Measurements in millimeters

| | <i>Female</i> | <i>Male</i> |
|---------------------------|-----------------------------|-------------|
| Antr. end to excret. pore | 0.63-0.85 | 0.63 |
| Antr. end to vulva | 0.69-0.87 | |
| Anus to postr. extremity | 0.65-0.71 | 0.18-0.21 |
| Intervals between striae | 11 μ | 7 μ |
| Eggs; length x breadth | 170-178 μ x 45-50 μ | |

Lateral alae are to be found in both males and females arising from the mid-oesophageal region. In the female the alae are visible in the anterior part of the body as narrow bands, only slightly elevated above the cuticular surface. In the male the alae broaden gradually



Fig. 16. *Pharyngodon mabuyae*. Egg drawn to show bi-polar opercula.

from before backwards, but they only become conspicuous in the posterior sixth of the body where they flare out into broad wings extending to the level of the cloaca. There are the usual three pairs of papillae. The preanal pair are smallest; the paranal and basal-caudal pairs are larger. Neither from the ventral nor the lateral view of the body can one see any cuticular expansion that can be regarded as a caudal ala or bursa.

Between the paranal papillae and projecting over the ventral border of the cloaca there arises a bluntly conical elevation which is flanked on either side by a serrated cuticular ridge or row of irregular cuticular spines. This structure is not described for other species of *Pharyngodon* but it is found in a number of species of the related genus *Thelandros*.

A slender, poorly chitinized spicule, measuring about 85 to 90 microns in length, is apparently present. However, it is so poorly definable that one cannot be sure of its existence.

For a discussion of the systematic relations of *P. mabuyae* see below.

THELANDROS SEURATI sp. nov.

Host: *Acontias percivali* Loveridge (Scincidae).

Location: Rectum.

Locality: Taita, Kenya Colony.

About a dozen specimens, of which only two were males, were found in the rectum of the above named host on two occasions. The females are all fully mature and contain several hundreds of eggs. The chief measurements of the species are as follows:

| | Female | Male |
|----------------------------------|---------------|-----------|
| Length | 4.4 -4.75 | 2.8 -2.85 |
| Maximum width (rather flattened) | 0.60 | 0.35 |
| Nerve ring to antr. end. | 0.18 | 0.17 |
| Exeret. pore to antr. end. | ? | 1.1 |
| Length of oesoph. including bulb | 1.2 -1.27 | 0.75-0.80 |
| Length of tail | 0.25-3.20 | 0.10 |
| Length of spicule | | 0.12 |
| Antr. end to vulva | 1.95-2.5 | |
| Eggs (length x width) | 0.076 x 0.040 | |

The worms are usually well preserved, turgid forms with conspicuous annulations which in the oesophageal region are about 25μ apart in the males and 30μ apart in females. Head set off from body by a well defined constriction. The three lips are plainly bilobed. Amphids are represented by fine tubules penetrating the latero-ventral lips towards the dorsal angle. Cephalic papillae are too small to be accurately described. There is a distinct buccal cavity in the form of a shallow saucer-like depression with a conical base. The broad lateral fields are composed of a small number of relatively large quadrate cells whose spherical nuclei are about 25μ in diameter. Lateral alae are not seen in the females but in the male (Fig. 17) the lateral alae flare out as conspicuous vanes which commence at a point, 0.31 mm. from the cloaca, to attain a width of 0.06 mm. and terminate in a broad curve at the point where the tail springs from the body. The tail of the male has the shape of an elongate cone, that is constricted and bent in the middle and is displaced dorsally by the development of a cushion-like cuticular prominence capped by the cloaca. Two pairs of slightly elevated papillae adorn this prominence; one pair on its anterior border and the other at the side, on a level with the cloacal aperture. The posterior lip of the cloaca is guarded by a conspicuous projection that resembles a large median papilla in appearance, but its tip bears a

series of exceedingly minute bosses or blunt spines, making it improbable that the structure is actually a papilla. It is, perhaps, homologous with the structure that has been interpreted as a gubernaculum in *Thelandros seurlabiate* Ortlepp, 1933, and as a median post-cloacal papilla in *Parapharyngodon maplestoni* Chatterji, 1933. In our



Fig. 17. *Thelandros seurlabiate*. Male in ventral view.

specimens there is no trace of the cuticular ctenoid structure that adorns the superior border of the cloaca of several species of *Thelandros* and which has been described in *Pharyngodon mabuyae*. The third pair of caudal papillae is the only one of the three pairs that could be described as pedunculate. It occupies the usual position in the proximal third of the caudal appendage. The spicule is a delicate structure, at least 0.12 mm. in length and about 7μ broad. It is poorly chitinized

and was only detected in one specimen where the rounded distal extremity of the spicule was found protruding from the cloaca.

Most of our female specimens exhibit the phenomenon referred to by Suerat (1914) as "endotokie matricide" wherein the eggs accumulate



Fig. 18. *Thelandros seurati*. Caudal extremity of male from lateral view.

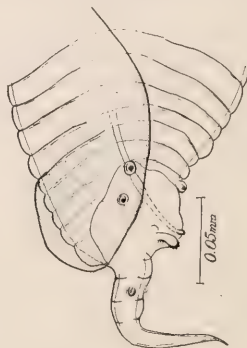


Fig. 19. *Thelandros seurati*. Caudal extremity of male from ventral view.

in the uteri in such numbers that other organs seem to degenerate and the body becomes little more than an egg sac. The excretory vesical



Fig. 20. *Thelandros seurati*. Caudal extremity of female.

and its pore can no longer be made out, and the position of the non-salient vulva, near the middle of the body, can only be detected in a few favorable specimens. There is a glandular vagina, about 0.12 mm. in length followed by a more muscular walled part, the ovejector, of about three times this length. The coils of the uteri extend into the turgid post-anal region of the body; anteriorly the two ovaries are



Fig. 21. *Thelandros seurati*. Egg with operculum at one pole.

coiled around the prebulbar stem of the oesophagus. The eggs (Fig. 21) are ellipsoidal in shape, with the thick outer shell finely striated and provided with an operculum at one pole.

SYSTEMATIC POSITION OF *Pharyngodon mabuyae* and
Thelandros seurati

The oxyurid parasites of reptiles are a primitive, or at least very specialized, group whose numerous representatives, now separated into about eight genera, show many features in common. Compact as the group is, none of the genera appear to be so closely related as are *Pharyngodon* and *Thelandros*, which are always placed in juxtaposition in comprehensive analytical surveys of the group. That real difficulties are experienced in keeping their constituent species apart is shown by the fact that, when not defined in exactly the same terms, different authors stress different morphological features in diagnosing the genera and separate them by different key characters. Perhaps the most elaborate definitions of these genera are those presented by Seurat (1917) who in a key separates the genera by the following characters:

- (a). Vulva situated immediately behind excretory pore; no vagina; eggs very large; tail of male greatly prolonged. . . . *Pharyngodon*
 - (b). Vulva considerably behind excretory pore; distinct vagina present; tail of male in dorsal position. *Thelandros*
- Seurat envisages *Thelandros* being derived from *Pharyngodon* by the loss of caudal alae and the concomitant diminution of the peduncle of the first pair of post-anal papillae and of the tail ("point caudale dorsale") in the male. These features, together with the differentiation of a vagina, are to Seurat indicative of the genus *Thelandros* being more highly evolved than *Pharyngodon*.

While the retention of these two genera could be advocated on the score of convenience, our investigation into the matter of the specific relationships of the two species described in this paper indicates that the various described species of *Thelandros* and *Pharyngodon* present a mosaic of characters that cannot be satisfactorily separated into elements sufficiently constant in their association to satisfy the requirements of separate genera. The purposes of taxonomy could probably be better served by treating the group as a single genus, *Pharyngodon*, constituted by two sub-genera:

Pharyngodon Pharyngodon (type; *P.P. spinicauda* (Dujardin)) and
Pharyngodon Thelandros (type; *P.T. alatus* (Wedl)).

The adoption of this procedure would probably check the creation of new monotypic genera that there is a tendency to propose for slightly aberrant species which cannot be fitted into either genus as diagnosed at present.

In *P. spinicauda*, the type species of Pharyngodon, as well as in several other species of the genus, we may recognize the following features as representing the most distinctive generic characters; the presence in the male of a fairly long subulate tail with relatively broad cuticular flanges or caudal alae arising just in front of the cloaca and usually extending far enough backwards to be supported by the post-anal pair of papillae. In the female, the tail is also long and sometimes spinose (*P. extenuatus* Rud.) but the most constant features are: (1) the conspicuous excretory pore, with the vulva contiguous with it and situated anteriorly in the region of the oesophageal bulb; (2) the eggs are large, elongated and provided with opercula at each pole.

Contrasting with this, in *Thelandros alatus*, the type, and in many if not all of the eleven species¹ which have been described in this genus, we find that there are no caudal alae in the male and that the tail proper (point caudale of Seurat) usually takes the form of a short, often spike-like, process that has been shifted dorsally by the massive development of a cuticular protuberance on which the cloacal aperture is situated. In the female the excretory pore is not so conspicuous, and the vulva, though slightly variable in position, is usually situated towards the middle of the body.

From the descriptions of the thirteen species assigned to Pharyngodon, little variation is found affecting the above mentioned generic characters of the female. However, there is a group of species, including *P. laevicauda* (Seurat), *P. extenuatus* (Rud.) *P. tectipenis* Gedoelst and *P. tarentolae* Spaul, in which the caudal alae do not extend sufficiently posteriad to embrace the last pair of papillae, and according to Spaul's key to the genus Pharyngodon, caudal alae are absent in the species *megalocerca* (Skrjabin). This feature is not mentioned in Skrjabin's description though reference to his illustrations supports Spaul's inference.

It therefore appears that among the species of Pharyngodon we can follow the gradual reduction of the caudal alae and we may interpret it as an evolutionary tendency towards the condition found in the various species of *Thelandros*. The special characteristics of the female, more particularly the form of the eggs, are more stable and consequently of greater taxonomic significance. It is mainly for this reason that we have assigned our parasite from *Mabuya varia* to the genus Pharyngodon; otherwise it could be as well accommodated in

¹ I have been unable to confirm these features in *T. oswaldocruzi* Travassos, 1925 and *T. micruris* Patwardhan, 1935, descriptions of which are not available to me. From Seurat's description it appears that post-cloacal alae are a differential feature of *T. numidicus*.

Thelandros. *P. mabuyae*, is evidently closely related to Skrjabin's *megalocerca*, which also was described from an East African representative of the Geckonidae. From this species, however, it may be distinguished by its general size, the length of the tail in the male and the shape of the lateral alae, etc.

Our species *seurati*, from the skink, *Acontias percivali*, is more typically a member of Thelandros. In the absence of the denticulate, cuticular processes on the anterior border of the cloaca, *seurati* appears to be very closely allied to *T. bulbosus* (v. Linstow). It is also close to *maplestoni*, a species for which Chatterji (1933) created the new, and to my mind, unnecessary, genus *Parapharyngodon*. From both of these species it may be distinguished by the size of its smaller eggs and relatively longer oesophagus as well as on other dimensions.

STRONGYLURIS BREVICAUDATA Müller, 1894

Host: *Heliosciurus rufobrachiatu*s *nyansae* (Neumann).

Locality: Sipi, Mt. Elgon, Uganda.

In all structural details our specimens, 15 females and 5 males, were indistinguishable from worms in our collection bearing the identification *S. brevicaudata* that were collected in East Africa from species of *Agama* and *Chameleon*. The head, with its three prominent lips is set off by a constriction from the main body and presents the same arrangement of cephalic papillae and amphids as is illustrated by Hsu (1932) for *S. brevicaudata* and by Harwood (1935) for *S. ornata*. The tapering flange of cuticle that projects anteriorly from the inner side of each lip is more prominent in some individuals than in others but this is apparently dependent upon the state of functional contraction at the time of fixation. The cuticle is delicately marked by fine striations, upon which is superimposed a coarser annulation or wrinkling. Commencing just behind the post-cephalic constriction, but not conspicuously forming a cervical ring, and arranged in a double row especially restricted to the dorsal and ventral cuticular fields, is a series of small but prominent papillae with narrow peduncles. These somatic papillae are present in both sexes, and extend at fairly regular intervals to within a short distance of the anus. In the female, the body tapers rapidly behind the anus to form a conical tail that is provided with a pair of prominent caudal papillae and a spike-like terminal appendage. In the male, the posterior end is very abruptly truncated and, obscured from view by the narrow bursa, the sucker, anus and

some of the caudal papillae are difficult to delineate. These organs are best seen by flattening the worm under a cover-glass or examining the cut-off tail in the end-on position. The presence of the usual ten pairs of caudal papillae can then be detected (Fig. 22). Of the three pairs of

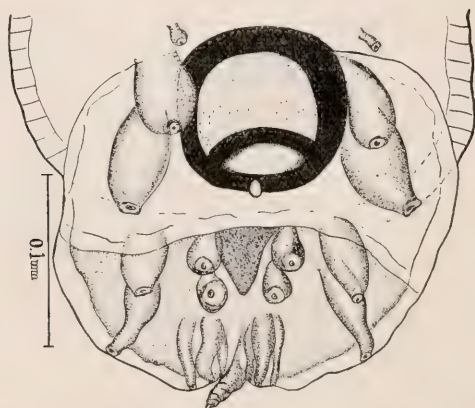


Fig. 22. *Strongyluris brevicaudata* from *Sciurus rufobrachiatu*s. Caudal extremity of male; ventral view.

parasuctorial papillae, the first are small and narrow compared with the large, fusiform second and third pairs. The three terminal pairs of papillae are closely set, the largest pair tending to hide one or other of the remaining two pairs so that it may easily be overlooked.

The chief measurements (in millimeters) of the worms are given in the following table:

| | Male | Female |
|------------------------------------|------------|--------------------------|
| Length | 8.9 -9.8 | 9.4 -12.6 |
| Breadth at equator | 0.65-0.74 | 0.7 -0.92 |
| Breadth at cervical constriction | 0.77 | 0.92 |
| Exeret. pore from antr. end. | 1.46-1.56 | 1.77-1.84 |
| Length of pharynx | 0.25-0.28 | 0.27-0.29 |
| Length of esophagus including bulb | 1.8 -2.0 | 2.1 -2.2 |
| Anus to postr. end. | 0.084-0.11 | 0.2 -0.23 |
| Caudal spine | 0.040 | 0.056-.075 |
| Diameter of sucker | 0.11-0.13 | |
| Sucker to anus | 0.08-0.09 | |
| Spicules (Equal) | 1.3 -1.52 | |
| Vulva to postr. end | | 3.8 -4.7 |
| Eggs | | 0.072-0.075 x 0.040-.042 |

DISCUSSION

Prior to the description of *Strongyluris paradoxus* Sandground, 1933, from a glossy ibis, *Hagedashia h. niloticus* from Tanganyika, some ten species of *Strongyluris* had been described. All had been found in lacertilian hosts and consequently the writer held it necessary to consider the possibility of there having been a mix-up of host labels or alternatively that the finding represented an instance of spurious parasitism such as may follow the preying of one animal upon another. However, the evidence surrounding the finding offered no support for such suspicions.

In the present paper we actually extend the host range of the genus *Strongyluris* further. No doubt can here be entertained concerning the authenticity of the host since the writer himself collected the worms from the caecum of the squirrel whose viscera were preserved in the field and brought back in a separate jar. Two additional specimens (♂ & ♀) of a closely related if not identical species of this genus bearing the label "Rat gris, Lac Albert, Congo Belge; Leg. Dr. Fornara," were later given to me by Dr. L. van den Berghe of the Prince Leopold Institute of Tropical Medicine, Antwerp. Hence, there can be no doubt of the genus *Strongyluris* being found in certain African rodents. Concerning the specific identification of the material some question may be raised. On first seeing the worms our first idea was that we were confronted with a new species, but, as subsequent study showed, it is difficult to support this contention. *S. brevicaudata*, the type of the genus, was first recorded from the West African *Agama agama agama* (—*A. colonorum*) and has since been reported from other species of East African *Agama*. Of the thirteen species that are now listed in the genus only two, namely *S. gigas* Spaul and *S. loveridgei* Spaul may be recognized by their significantly larger size. In the absence of other specific criteria, the great variation in length and the proportions of various parts of the body makes the identification of most of the remaining species rather uncertain. Baylis and Daubney (1922) and Spaul (1923) have questioned the validity of several species, while Taylor (1925) contended that *S. ornata* Gendrey, and *S. streptosophaus* Connal and probably also *S. chamaeleonis* Baylis and Daubney and *S. calotis* Baylis and Daubney are indistinguishable from the genotype. Recently, however, Harwood (1935) after a scrutiny of the literature and the examination of some of the material in our museum's helminthological collection, has constructed a key to the genus wherein he tentatively reestablishes the validity of all the species

whose standing has come into disrepute. Whether the characters utilized by Harwood are specifically significant need not concern us in considering the status of the species here involved, for not only do its structural features and dimensions coincide for those described for *S. brevicaudata* but prolonged comparison of the specimens with others from various species of *Agama* has failed to reveal a single distinguishing feature. Though one might expect that a lacertilian parasite could not become adapted to a mammal without some accompanying somatic changes, these presumptive morphological differences are so elusive that an identification of *S. brevicaudata* is the only one warranted.

BIBLIOGRAPHY

- BAYLIS, H. A. and DAUBNEY, R.
1922. Report on the parasitic nematodes in the collection of the Zoölogical Survey of India. Mem. Indian Mus. **7**, p. 263.
- BAYLIS, H. A.
1933. On a collection of nematodes from Malayan reptiles. Ann. & Mag. Nat. Hist. ser. 10. **11**, p. 615.
- CHATTERJI, R. C.
1933. On a new nematode, *Parapharyngodon maplestoni*, from a Burmese lizard. Ann. Trop. Med. and Par. **27**, p. 131.
- CHITWOOD, B. G. and WEHR, E. E.
1934. The value of cephalic structures as characters in nematode classification, with special reference to the superfamily Spiruroidea. Ztschr. f. Parasitenk. **7**, p. 273.
- GEDOELST, L.
1919. Une espèce nouvelle de Pharyngodon. C. R. Soc. Biol. **82**, p. 869.
- HARWOOD, P. D.
1932. The helminths parasitic in the Amphibia and Reptilia of Houston, Texas and vicinity. Proc. U. S. Nat. Mus. **81**, Art. 17, pp. 1-71.
- HARWOOD, P. D.
1935. Two new species of *Strongyluris* (Nematoda) and notes on the genus. Jl. Tennessee Acad. Sci. **10**, p. 131.
- LENT, H. and FREITAS, J. F. T. DE
1935. Sobre uma nova especie do genero Oswaldocruzia Travassos, 1917. Mem. Inst. Osw. Cruz. 30, fasc. 3, p. 379.
- ORTLEPP, R. J.
1922. The nematode genus *Physaloptera* Rud. Proc. Zoöl. Soc. London. Dec. 1922, p. 999.
1926. On the identity of *Physaloptera caucasica* v. Linstow, 1902 and *Physaloptera mordens* Leiper, 1908. Jl. Helminthology **4**, p. 199.
- ORTLEPP, R. J.
1933. On some South African Reptilian Oxyurids. Onderstepoort Jl. Vet. Sci. & Animal Ind. **1**, p. 99.
- SANDGROUND, J. H.
1933. Parasitic nematodes from East Africa and Southern Rhodesia. Bull. Mus. Comp. Zoöl. Harvard. **75**, No. 2, p. 274.

SCHULZ, R. E.

1927. Die Familie Physalopteridae Leiper, 1908, und die Prinzipien ihrer Klassifikation. (Russian with German summary.) Samml. Helminth. Arb. Prof. K. I. Skrjabin gewidmet. Moskau. p. 221.

SEURAT, L. G.

1914. Sur un cas d'endotokie matricide chez un Oxyure. C. R. Soc. Biol. **76**, p. 850.
1914a. Sur un nouvel oxyure des reptiles. Ibid. **77**, p. 96.
1917. Sur les Oxyures des Sauriens du Nord-Africain. Arch. Zoöl. Exp. et. Gen. **56**, p. 401.

SPAUL, E. A.

1923. Nematodes of the genus Strongyluris from Agama. Ann. & Mag. Nat. Hist. ser. 9, **12**, p. 149.
1926. On a new species of the nematode genus Pharyngodon. Ibid. ser. 9, **17**, p. 585.

SKRJABIN, K. I.

1916. Parasitic trematodes and nematodes collected by the expedition of Prof. V. Dogiel and I. Sokolov. in East Africa. **1**, p. 99.

STEFANSKI, W.

1934. Sur le developpement et les caractères spécifiques de *Spirura rytipteurites* (Deslongchamp). Ann. de Parasitologie **12**, p. 203.

TAYLOR, E. L.

1924. Notes on some nematodes in the Museum of the Liverpool School of Tropical Medicine. Ann. Trop. Med. & Parasit. **18**, p. 608.

Bulletin of the Museum of Comparative Zoölogy

AT HARVARD COLLEGE

VOL. LXXIX, No. 7

SCIENTIFIC RESULTS OF AN EXPEDITION
TO RAIN FOREST REGIONS IN EASTERN AFRICA

VII

AMPHIBIANS

The Library
Museum of Comparative Zoology
Harvard University

BY ARTHUR LOVERIDGE

WITH THREE PLATES

CAMBRIDGE, MASS., U.S.A.

PRINTED FOR THE MUSEUM

DECEMBER, 1936

No. 7.— *Reports on the Scientific Results of an Expedition to Rain Forest
Regions in Eastern Africa*

VII

Amphibians

BY ARTHUR LOVERIDGE

CONTENTS

| INTRODUCTION | PAGE |
|--|------|
| Material | 369 |
| Acknowledgments | 370 |
| Summary of novelties and changes | 370 |
| List of species collected | 373 |
| SYSTEMATIC DISCUSSION | |
| Caecilians | 375 |
| Toads | 380 |
| Tree and sedge frogs | 383 |
| Terrestrial frogs | 408 |
| BIBLIOGRAPHY | 429 |

INTRODUCTION

The collection on which this report is based was made by the author, as a Fellow of the John Simon Guggenheim Foundation, with a view to elucidating the present-day distribution of the montane, sylvicoline fauna of certain mountains in eastern Uganda and Kenya Colony.

This subject will be dealt with in the concluding contribution to the series of reports, in a paper which will also contain the itinerary and full information regarding localities and altitudes.

MATERIAL

The period of collecting was from November 8, 1933, to July 9, 1934, during which time, 2,528 amphibians, representing 46 species,

were preserved. A dozen additional species donated by friends, though dealt with in this paper, are not included in the total, of which 2 species of caecilian and 8 of toads and frogs are new to the collections of the Museum of Comparative Zoölogy.

One might single out for special mention, topotypes of *Dermophis gregorii*, *Boulengerula denhardti* and *Bdellophis unicolor*. Each of these has been known from the holotype only, the two latter are now relegated to the synonymy of the former. Also a good series of the rare *Bufo steindachnerii* and topotypes of *Leptopelis concolor* and *Rana wittei* both known only from their respective holotypes.

ACKNOWLEDGEMENTS

The material generously donated by Messrs R. E. Moreau, C. A. du Toit, and H. J. Allen Turner is distinguished in the following pages by the initials of the collector. The Museum is deeply grateful to these gentlemen for their welcome gifts.

I am indebted to Herr. P. de Grijs of the Zoological Museum at Hamburg for allowing me to examine certain of the Pfeffer types carefully preserved in that institution. My thanks also go to Mr. H. W. Parker of the British Museum for answering questions relative to specimens in his charge.

Mr. R. D. Milne of Witu, took the delightful photograph of frogs' nests which is reproduced on plate 2, fig. 1. I am indebted to my wife for the other illustrations accompanying this paper. They are from photographs taken with the small Rolleiflex camera.

SUMMARY OF NOVELTIES AND CHANGES

The only novelties in the collection were:

Boulengerula taitanus, Mount Mbololo, Taita Mountains, Kenya Colony.

Hyperolius milnei, Witu, and other coastal localities in Kenya.

Hyperolius ahli sp. n., Lake Peccatoni, Coastal Province, Kenya Colony.

In addition to these new forms and *Arthroleptides dutoiti* Loveridge, collected by Mr. C. A. du Toit at Koitobos River, Mount Elgon, on the Kenya side, the undermentioned species are recorded from Uganda or Kenya for the first time.

New for Uganda

- Rana fuscigula chapini* Noble of the Belgian Congo.
Rana oxyrhynchus gribinguiensis Angel of the French Congo.
Rana ansorgii Boulenger of Angola.
Phrynobatrachus graueri (Nieden) of Belgian Ruanda-Urundi.

New for Kenya Colony

- Xenopus laevis victorianus* Ahl of Tanganyika Territory.
Bufo steindachnerii Pfeffer of Tanganyika Territory.
Leptopelis johnstoni (Boulenger) of Nyasaland.
Hylambates maculatus Duméril of Zanzibar.
Megalixalus brachynemis Boulenger of Nyasaland.
Hyperolius rossii (Calabresi) of the Belgian Congo.
Hyperolius undulatus (Boulenger) of the Belgian Congo.
Hyperolius ? vermicularis Ahl of Zanzibar.
Hyperolius sansibaricus (Pfeffer) of Zanzibar.
Hyperolius parkeri Loveridge of Tanganyika Territory.
Rana edulis (Peters) of Mozambique.
Rana fuscigula chapini Noble of the Belgian Congo.
Rana fuscigula angolensis Bocage of Angola.
Rana oxyrhynchus gribinguiensis Angel of the French Congo.
Rana mascareniensis venusta Werner of Uganda, etc.
Arthroleptis adolfifriederici Nieden of Belgian Ruanda-Urundi.

All these species are known from Tanganyika Territory, and several have been recorded from Kenya though under other names, as for example *Rana edulis*, hitherto confused with the South African *adspersa*.

The genera *Hylambates sensu strictu* and *Arthroleptides* have their range extended northwards into Kenya.

The undermentioned are considered to be synonyms:

- | | |
|---|--|
| <i>Boulengerula denhardti</i> Nieden | = <i>Dermophis gregorii</i> Boulenger |
| <i>Bdellophis unicolor</i> Boettger | = <i>Dermophis gregorii</i> Boulenger |
| <i>Cassina angeli</i> Witte | = <i>Kassina senegalensis</i> Duméril & Bibron |
| <i>Hyperolius brevipalmatus</i> Ahl | = <i>Megalixalus fulvovittatus</i> (Cope) |
| ¹ <i>Hyperolius pygmaeus</i> Ahl | = <i>Megalixalus brachynemis</i> Boulenger |

¹ As explained in the text, I synonymized this with *M. fornasini* through a confusion of material.

| | |
|---|--|
| <i>Hyperolius phrynoderma</i> Ahl | = <i>Hyperolius rossii</i> (Calabresi) |
| <i>Hyperolius mohasicus</i> Ahl | = <i>Hyperolius rossii</i> (Calabresi) |
| <i>Hyperolius oculatus</i> Ahl | = <i>Hyperolius rossii</i> (Calabresi) |
| ? <i>Hyperolius irregularis</i> Ahl | = <i>Hyperolius rossii</i> (Calabresi) |
| <i>Rappia symetrica</i> Mocquard | = <i>Hyperolius undulatus</i> (Boulenger) |
| <i>Rappia platyrhinus</i> Proctor | = <i>Hyperolius undulatus</i> (Boulenger) |
| <i>Hyperolius asper</i> Ahl | = <i>Hyperolius undulatus</i> (Boulenger) |
| <i>Hyperolius nyassae</i> Ahl | = <i>Hyperolius undulatus</i> (Boulenger) |
| ? <i>Hyperolius pulchromarmoratus</i> Ahl | = <i>Hyperolius striolatus</i> Peters |
| <i>Hyperolius scheffleri</i> Ahl | = <i>Hyperolius striolatus</i> Peters |
| <i>Hyperolius melanophthalmus</i> Ahl | = <i>Hyperolius mariae</i> Barbour & Loveridge |
| <i>Hyperolius renschi</i> Ahl | = <i>Hyperolius mariae</i> Barbour & Loveridge |
| <i>Hyperolius rubripes</i> Ahl | = <i>Hyperolius sansibaricus</i> (Pfeffer) |
| <i>Hyperolius noblei</i> Ahl | = <i>Hyperolius puncticulatus</i> (Pfeffer) |
| <i>Hyperolius callichromus</i> Ahl (part) | = <i>Hyperolius argentovittis</i> Ahl |
| <i>Hyperolius flavoviridis</i> Peters | = <i>Hyperolius argus</i> Peters |
| <i>Hyperolius tettensis</i> Peters | = <i>Hyperolius argus</i> Peters |
| <i>Rappia platycephala</i> Pfeffer | = <i>Hyperolius argus</i> Peters |
| <i>Rappia granulata</i> Boulenger | = <i>Hyperolius nasutus</i> Günther |
| <i>Hyperolius microps</i> Günther | = <i>Hyperolius pusillus</i> (Cope) |
| <i>Hyperolius usaramoae</i> Loveridge | = <i>Hyperolius pusillus</i> (Cope) |
| <i>Hyperolius translucens</i> Power | = <i>Hyperolius pusillus</i> (Cope) |
| <i>Phrynopsis boulengeri</i> Pfeffer | = <i>Rana edulis</i> (Peters) |
| <i>Pyxicephalus flavigula</i> Calabresi | = <i>Rana edulis</i> (Peters) |
| <i>Phrynopsis usambarae</i> Ahl | = <i>Rana edulis</i> (Peters) |
| <i>Rana aberdarensis</i> Angel | = <i>Rana wittei</i> (Angel) |
| <i>Rana erlangeri</i> Ahl | = <i>Rana floweri</i> Boulenger |
| <i>Arthroleptis stenodactylus</i> | |
| <i>uluguruensis</i> Loveridge | = <i>A.s. lönnbergi</i> Nieden |

LIST OF SPECIES COLLECTED¹

| CAECILIIDAE | Page |
|---|------|
| <i>Dermophis gregorii</i> Boulenger | 375 |
| <i>Boulengerula taitanus</i> Loveridge | 378 |
| <i>Boulengerula changamwensis</i> Loveridge | 378 |
| PIPIDAE | |
| <i>Xenopus laevis victorianus</i> Ahl | 379 |
| (<i>Xenopus muelleri</i> (Peters)) | 379 |
| BUFONIDAE | |
| <i>Bufo regularis regularis</i> Reuss | 380 |
| <i>Bufo steindachnerii</i> Pfeffer | 381 |
| (<i>Bufo lönnbergi nairobiensis</i> Loveridge) | 383 |
| POLYPEDATIDAE | |
| <i>Chiromantis xerampelina</i> Peters | 383 |
| <i>Leptopelis concolor</i> Ahl | 385 |
| <i>Leptopelis johnstoni</i> (Boulenger) | 387 |
| <i>Hylambates maculatus</i> Duméril | 387 |
| <i>Kassina senegalensis</i> (Duméril & Bibron) | 388 |
| <i>Megalixalus fornasinii</i> (Bianconi) | 390 |
| <i>Megalixalus fulvovittatus</i> (Cope) | 391 |
| <i>Megalixalus brachynemis</i> Boulenger | 391 |
| <i>Hyperolius rossii</i> (Calabresi) | 393 |
| <i>Hyperolius picturatus</i> Peters | 394 |
| (<i>Hyperolius montanus</i> (Angel)) | 395 |
| <i>Hyperolius undulatus</i> (Boulenger) | 395 |
| <i>Hyperolius flavoguttatus</i> Ahl | 397 |
| <i>Hyperolius striolatus</i> Peters | 397 |
| (<i>Hyperolius mariae</i> Barbour & Loveridge) | 398 |
| (<i>Hyperolius</i> ? <i>vermicularis</i> Ahl) | 399 |
| <i>Hyperolius sansabanicus</i> (Pfeffer) | 400 |
| <i>Hyperolius puncticulatus</i> (Pfeffer) | 401 |
| (<i>Hyperolius argentovittis</i> Ahl) | 401 |

¹ Species in parenthesis were collected and presented by others.

POLYPEDATIDAE continued

Page

| | |
|---|-----|
| <i>Hyperolius ahli</i> sp. nov. | 402 |
| <i>Hyperolius parkeri</i> Loveridge | 404 |
| <i>Hyperolius nasutus</i> Günther | 405 |
| <i>Hyperolius milnei</i> Loveridge | 406 |
| <i>Hyperolius pusillus</i> (Cope) | 407 |

RANIDAE

| | |
|--|-----|
| <i>Rana edulis</i> (Peters) | 408 |
| <i>Rana occipitalis</i> Günther | 409 |
| <i>Rana fuscigula chapini</i> Noble | 409 |
| <i>Rana fuscigula angolensis</i> Bocage | 410 |
| <i>Rana wittei</i> (Angel) | 411 |
| <i>Rana galamensis bravana</i> (Peters) | 413 |
| <i>Rana floweri</i> Boulenger | 414 |
| <i>Rana oxyrhynchus oxyrhynchus</i> Smith | 415 |
| <i>Rana oxyrhynchus gribinguiensis</i> Angel | 416 |
| <i>Rana mascareniensis mascareniensis</i> Duméril & Bibron | 417 |
| (<i>Rana mascareniensis uzungwensis</i> Loveridge) | 418 |
| <i>Rana mascareniensis venusta</i> Werner | 419 |
| (<i>Rana ansorgii</i> Boulenger) | 419 |
| (<i>Arthroleptides dutoiti</i> Loveridge) | 420 |
| (<i>Arthroleptis stenodactylus lönnbergi</i> Nieden) | 420 |
| <i>Arthroleptis adolfriederici</i> Nieden | 420 |
| <i>Arthroleptis minutus</i> Boulenger | 421 |
| <i>Phrynobatrachus keniensis</i> Barbour & Loveridge | 422 |
| <i>Phrynobatrachus graueri</i> (Neiden) | 424 |
| <i>Phrynobatrachus kinangopensis</i> Angel | 424 |
| <i>Phrynobatrachus acridoides</i> (Cope) | 425 |
| <i>Phrynobatrachus natalensis</i> (Smith) | 426 |
| <i>Hemisis marmoratum marmoratum</i> (Peters) | 426 |

BREVICIPITIDAE

| | |
|---|-----|
| (<i>Hoplophryne rogersi</i> Barbour & Loveridge) | 427 |
| <i>Phrynomerus bifasciatus</i> (Smith) | 428 |

CAECILIIDAE

DERMOPHIS GREGORII Boulenger

Dermophis gregorii Boulenger, 1894, Proc. Zool. Soc. London, p. 646, pl. xl, fig. 4: Ngatana, Tana River, Kenya Colony.

Boulengerula denhardti Nieden, 1912, Sitz. Ges. naturf. Freunde Berlin, p. 199: Tana Region, Kenya Colony.

Bdellophis unicolor Boettger, 1913, in Voeltzkow, Reise in Ostafrika, 3, p. 353, pl. xxiii, fig. 18: Peccatoni, Kenya Colony.

130 (M.C.Z. 20101-50) Peccatoni, near Witu, K.C. 24-26.v.34.

4 (M.C.Z. 20151-4) Mkonumbi, near Witu, K.C. 28.v.34.

1 (M.C.Z. 20054) Mombosasa, near Witu, K.C. 31.v.34.

48 (M.C.Z. 20055-92) Kau, n. bank Tana River, K.C. 4.vi.34.

3 (M.C.Z. 20093-5) Laini, s. bank Tana River, K.C. 6.vi.34.

2 (M.C.Z. 20096-7) Ngatana, n. b. Tana River, K.C. 20.vi.34.

Native names. *Nyoka mai* (Kiamu, literally 'water snake') at Mkonumbi; *sango* (Kipokomo) at Kau; *ntzango* (Kipokomo) at Ngatana.

Synonymy. The Ngatana specimens are topotypes of *gregorii*, the Kau and Laini of *Boulengerula denhardti*, the Peccatoni of *Bdellophis unicolor*. Peccatoni is only fifty miles from Ngatana, the other localities lie between or a little to the south.

These three species, *gregorii*, *denhardti* and *unicolor*, are only known from the types so these localities were visited with the object of obtaining adequate material for comparative studies.

The coloring of the types was as follows:

gregorii. "Dark brown above, paler beneath."

denhardti. "Light yellowish brown."

unicolor. "Uniform glossy black resulting in a lacquered appearance."

The last description aptly described my material when freshly caught, now they are plumbeous, slightly darker above than below. I consider the first two descriptions were based on specimens in various stages of fading.

The number of primary and secondary annuli were for

| | |
|------------------|-----------------------------|
| <i>gregorii</i> | 160 according to Boulenger. |
| <i>denhardti</i> | 165 according to Nieden. |
| <i>unicolor</i> | 145 according to Boettger. |

giving a range of 20 which is less variation than is known to occur in *Scolecormorphus uluguruensis* of which an adequate series was available.

Generic status. I have compared our material with topotypes of the genotype (*mexicanus*) of *Dermophis* as well as with topotypes of the genotype (*boulengeri*) of *Boulengerula* and fail to see any external characters on which these genera could be separated. A careful examination discloses what are apparently cycloid scales in the skin of *Boulengerula* (notwithstanding my key of 1930, p. 8) though Tornier made no mention of them and they are not so well developed as in *gregorii*.

Dermophis gregorii differs from the four species of *Boulengerula* in its eye being distinct and the great number of secondary annuli on the posterior portion of the body. In these characters it agrees with *mexicanus*. There is a possibility that *Dermophis* itself is a synonym of *Gymnophis*, and as my friend Professor de Villiers is engaged on anatomical investigations as to the status of these genera, the present name may stand pending the publication of his results.

Variation. Dunn (1928, p. 71) has emphasized the advisability of confining counts to the primary annuli owing to the varying degree of distinctness exhibited by the secondary rings. For comparative purposes I have treated the material by dividing it into two lots. The 53 Tana River caecilians have from 107 to 118 primary annuli, average 112.4, while 53 of the Lake Peccatoni series have from 111 to 119 primary annuli with an average of 114.8

Measurements. The 53 Tana River caecilians range from 147 to 300 mm. (M.C.Z. 20055) in length with midbody diameters of from 5 to 10 mm. giving a variation of diameter into length of 26.2 to 35.8 with an average of 29.7.

The 53 Lake Peccatoni specimens used range from 127 to 360 mm. (M.C.Z. 20114) in length with midbody diameters of from 4.5 to 14.5 mm. giving a variation of diameter into length of 23.4 to 37.2 with an average of 30.2.

Breeding. Ova in those examined were minute, nevertheless the natives at Peccatoni stated that these caecilians lay great numbers of eggs during the rainy season, and that they lay them under water!

Diet. Stomachs of Tana River specimens held termites, those of Peccatoni caecilians, earth worms.

Habitat. In view of the rarity of this creature, of which only three specimens have been taken in forty years, the following notes on their habitat may be of interest.

The 'big rains' had broken nearly a month before, and torrential downpours were occurring daily. On May 24, I captured the first through seeing its tail projecting from a small tussock of earth and grass which projected above the surface of a sheet of water in a flooded extension of Lake Peccatoni.

This was shown to the natives in the village who stated that, though they dig up these caecilians in their gardens a quarter-of-a-mile from the shore of the lake, they are most abundant at the water's edge. During the course of the next two days, a score of men secured the series listed above, then told me that if I had only come in the dry season they would have procured a thousand with the same amount of exertion that they now dug up a hundred. Some said that in the dry season they could be found in writhing masses by digging in shallow water, from which it may be deduced that there is a tendency to concentrate in moist situations during the dry weather. One and all agreed that they live under water. I examined the spot from whence the series had been obtained and found that they had been dug from black mud, which had a slight admixture of sand, beneath the waters of the lake.

The Kau series was obtained during the course of an afternoon by native children digging in the mud close to the village. The whole Tana delta in the vicinity of the village was waterlogged, and storm after storm of rain swept over the countryside until about two hours before sunset.

Despite the willingness of the Wema villagers at Ngatana to bring in specimens, and urgent requests for caecilians, only two were procured. One was taken in mud under sedges on the river bank, the other in dryish earth at the base of some bananas less than a hundred yards from the river, but a mile and a half below Wema.

This creature, I found, was well-known to the natives at Golbanti. They said it occurred in the mud where they plant rice on the edge of an extensive swamp. I visited the place and found conditions closely paralleling those at Lake Peccatoni. One Mpokomo told me that very early in the month of June he had killed great numbers of caecilians while cutting his rice crop; he thought that they were a kind of snake. We spent a morning digging in the man's rice plot and at suit-

able spots in the vicinity but without result. Though half the population of Golbanti was at work in these rice fields during the two days I camped in the village, not a caecilian was brought in.

It will be noted that the time of their abundance at Golbanti coincides with that of Kau. It seems probable therefore, that these caecilians approach the surface during the heaviest part of the 'big rains' when the subsoil is flooded, and retire to greater depths as the rains slacken. However, on June 22-23, at Golbanti, water welled up and stood in many places when we dug more than eight inches below the surface.

BOULENGERULA TAITANUS Loveridge

Boulengerula taitanus Loveridge, 1935, Bull. Mus. Comp. Zoöl., **79**, p. 16:
Mount Mbololo, Taita Mountains, Kenya Colony.

30 (M.C.Z. 20001-24) Mt. Mbololo, K.C. 14-24.iv.34.

Native name. *Murwe* (Kitaita).

Parasites. Nematodes (*Oxyurus* sp.) present in the intestines.

Habitat. Taken in the rich leaf mould by digging beneath rotting tree trunks between 4,000 and 4,800 feet. The stomach contents of those examined was so finely masticated as to be indeterminate. No signs of breeding were noted.

BOULENGERULA CHANGAMWENSIS Loveridge

Boulengerula changamensis Loveridge, 1932, Bull. Mus. Comp. Zoöl., **72**, p. 381: Changamwe, near Mombasa, Kenya Colony.

3 (M.C.Z. 20098-100) Changamwe, K.C. 4.vii.34.

Variation. Annuli 146-152.

Measurements. Now the largest known example (M.C.Z. 20098) measures 235 mm. in total length; midbody diameter 5 mm.; the diameter being included in the length 5 times as against 4.5 times in the type.

Breeding. No signs of it in either of two examined.

Dict. Numerous termites in one of two stomachs examined.

Habitat. These topotypes were also taken under a mango tree, possibly the same one from whence the type series came. Though on several successive days, energetic search was made in many situations which appeared promising, no others were forthcoming.

PIPIDAE

XENOPUS LAEVIS VICTORIANUS Ahl

Xenopus victorianus Ahl, 1924, Zoöl. Anz., **60**, p. 270: Busisi, Lake Victoria, Tanganyika Territory.

19 (M.C.Z. 20155-64) Kaimosi, K.C. 19.ii.34.

Native name. *Likele* (Luragoli, but also applied to toads).

Coloration in life. Above, uniformly black. Below, throat, chest and abdomen white, vermiculated with gray; posterior portion of body and underside of limbs bright yellow thickly covered with large, black spots. Based on a breeding adult, immature examples more or less immaculate as stated in my (1933, p. 351) key.

Measurements. A female measuring 70 mm. is the largest known example of this race.

Breeding. Many pairs were taken in embrace, all females examined were distended with ova resulting in the greatest width of head being included *twice* in the width of the body.

Habitat. Taken in a corner of the mill pond (pl. i, fig. 1) where covered by a dense matting of broken and rotting sedges. With care one could walk on this floating vegetation and by depressing it in a given spot my wife found that the *Xenopus* popped up. The series was obtained by a systematic application of this method; a retrial of it on successive days, however, failed to produce any more, so it is possible that they had assembled at this spot for breeding (many being in *coitu*), or alternatively that we had captured the majority.

Diet. Large quantities of larval and freshly-emerged neuroptera, a water boatman and other hemipteron, limbs of a spider.

XENOPUS MUELLERI (Peters)

Dactylethra muelleri Peters, 1844, Monatsb. Akad. Wiss. Berlin, p. 37: Mozambique.

2 (M.C.Z. 19865-6) Eldoret, K.C. (C.A. du T.) 25.i.34.

Distribution. Part of a series obtained on the Doinyo Lessos Estate, Uasin Gishu Plateau, by Mr. du Toit.

BUFONIDAE

BUFO REGULARIS REGULARIS Reuss

Bufo regularis Reuss, 1834, Mus. Senckenberg, 1, p. 60: Egypt.

- 2 (M.C.Z. 20205-6) Mt. Kinangop, K.C. (H.J.A.T.) 1930.
- 1 (M.C.Z. 20207) Mt. Debasien, U. 24.xi.33.
- 13 (M.C.Z. 20208) Sipi, Mt. Elgon, U. 12.xii.33.
- 7 (M.C.Z. 20209) Butandiga, Mt. Elgon, U. 8.i.34.
- 1 (M.C.Z. 20210) Elgonyi, Mt. Elgon, K.C. 31.i.34.
- 4 (M.C.Z. 20211) Kaimosi, K.C. 10.ii.34.
- 1 (M.C.Z. 20212) Kibwezi, K.C. 23.iii.34.
- 1 (M.C.Z. 20213) Voi, K.C. 10.iv.34.
- 1 (M.C.Z. 20214) Mt. Mbololo, K.C. 22.iv.34.
- 1 (M.C.Z. 20215) Lamu, Lamu Id., K.C. 7.v.34.
- 2 (M.C.Z. 20216) Ngatana, Tana R., K.C. 11.vi.34.
- 1 (M.C.Z. 20217) Karawa, K.C. 26.vi.34.
- 3 (M.C.Z. 20218) Malindi, K.C. 29.vi.34.

Distribution. Also captured and released at Budadiri and Nairobi.

Native names. *Akidodok* (Karamojong for all toads and frogs); *likeru* (Lugishu); *likele* (Luragoli, but also for *Xenopus*); *lisheri* (Lutereki); *chula* (Kitaita, but not specific); *hovehove* (Kipokomo, but not specific).

Coloration in life. The Lamu specimens were a rather handsome olive color with cream-colored markings; it was their breeding season. The male from Ngatana had red on its flanks extending forwards to midbody, in addition to the more usual red on the hinder aspect of the thighs.

Measurements. The largest ♂ (M.C.Z. 20218) measures 85 mm.; the largest ♀ (M.C.Z. 20209), as well as Sipi females, also 85 mm.

Breeding. On February 10, at Kaimosi, calling, pairing (pl. i, fig. 2), and spawning in shallow pools outside the forest. On May 7, at Lamu, they were to be heard calling everywhere, and many jumped into deep wells in the ecstasies induced by the first big rains. On June 29, at Malindi, a male was taken calling, in company with others, in a swamp.

Parasites. A leech was attached to the rump of a breeding male at Kaimosi, on detaching itself it left a raw circular patch. Leeches were seen on others in this pool.

Enemies. A young toad in the stomach of a Green Snake (*Chlorophis hoplogaster*) at Butandiga, an adult female in a Nosehorned Viper (*Bitis nasicornis*) at Kaimosi.

Habitat. From 100 to 7,000 feet. The Debasien toad was ensconced beneath a log in very dry forest. The Elgonyi specimen was also taken in a clearing in dry forest but near a stream.

BUFO STEINDACHNERII Pfeffer

Bufo Steindachnerii Pfeffer, 1893 (1892), Jahr. Hamburg Wiss. Anst. **10**, p. 103, pl. ii, fig. 8: Kihengo, Tanganyika Territory.

- 1 (M.C.Z. 20165) Lamu, Lamu Id., K.C. 9.v.34.
- 16 (M.C.Z. 20166-9) Mkonumbi, K.C. 22.v.34.
- 17 (M.C.Z. 20170-4) Peccatoni, K.C. 24.v.34.
- 6 (M.C.Z. 20175-9) Near Witu, K.C. 30.v.34.
- 7 (M.C.Z. 20180-4) Laini, Tana R., K.C. 6.vi.34.
- 31 (M.C.Z. 20185-9) Ngatana, K.C. 9.vi.34.
- 89 (M.C.Z. 20190-9) Golbanti, K.C. 22.vi.34.
- 1 (M.C.Z. 20200) Malindi, K.C. 28.vi.34.

Distribution. The finding of this, hitherto the rarest of East African toads, in Kenya, not only adds a species to the fauna of that Colony but clears up an anomalous distribution. Since the taking of the type near Morogoro in central Tanganyika, the species has not been collected in that Territory, and there has been nothing to link that record with the one from between Badditu and Dimé in Gallaland. It now appears that the species is a coastal form that happened to be described from the most southerly limit of its range.

Variation. Superficially, particularly as regards color pattern, this species closely resembles a third-grown *B. r. regularis*. They may be distinguished by the key characters employed by Noble (1924, p. 167) with the exception that the first finger, though normally shorter than the second as in the right hand of M.C.Z. 20190, may be equal to it as in the left hand of the same specimen. The absence of a tarsal fold, more acuminate snout, greater wartiness, all assist in separating *steindachnerii* from *regularis*.

Coloration in life. ♂. Malindi. Above, yellow ochre with numerous markings in burnt umber, viz. a streak from the nostril downwards to the buccal border and posteriorly to the eye; a pair of light-centered streaks from the upper eyelids directed inwards and backwards so as to almost form a V but interrupted on the vertebral line, this marking is followed by three or four similar pairs of blotches; dorsal tubercles ochraceous with umber spines; limbs regularly barred and blotched; on groin, hinder aspect of thigh, and sometimes on the

tibia as well, are patches of rose-carmine or madder. Below, dirty white, region of gular sac gray; soles of fore and hind feet dark.

Measurements. The largest ♂ (M.C.Z. 20175) measures 52 mm.; largest ♀ ♀ (M.C.Z. 20190-1) measure 54 mm.

Breeding. Males only were met with at Lamu and Mkonumbi, in the last locality they were calling vociferously as in all localities, including Kau, to Ngatana, that is to say from May 22 to June 20. They may have been calling at Golbanti and Malindi but no notes were made. The change in the proportion of the sexes was most instructive. At Peccatoni 7 males and 2 females, at Witu 5 males and 1 female, at Laini 1 male and 6 females, at Ngatana 5 males and 26 females, at Golbanti 18 males and 71 females. The females were gravid in all localities. A puzzling fact, however, was the collecting of eight 18 mm. young at Peccatoni on May 24, though as the lake exists throughout the dry season, and the rains had already been coming down for a month, it seems possible that some toads had spawned at the very commencement of the first rains.

Dict. Ants predominated in the first eight stomachs examined, these were of toads from all localities, except Lamu, to Ngatana, the only other creatures present were a carabid beetle, spider and woodlouse. A different picture was presented by the two Golbanti stomach contents, these consisted of (1) an ant, cicindelid beetle, beetle larva, 5 woodlice; (2) two beetle larvae, two millipedes, ten woodlice.

Parasites. Nematodes present in a Golbanti toad were not preserved.

Enemies. Recovered from the stomachs of Olive Water Snakes (*Natrix o. olivacea*) at Laini and Ngatana, also from those of a White-lipped Snake (*Crotaphopeltis h. hotamboeia*) and a Night Adder (*Causus resimus*) at Ngatana.

Habitat. The call of this species, which attracted my attention to it, is quite distinct from that of *regularis* though with a certain similarity in a minor key. In the flooded areas where rains had formed lakes, the males sit calling on lily pads or weeds floating on the surface, they also hide among the roots of tussocks of grass which are just showing above the water. In the last situation they are exceptionally difficult to detect as their coloring blends and harmonizes with that of the peaty tussocks. However cautiously one approaches them, they usually cease calling before you can get within six feet. If you still persist in moving in their direction, they slip quietly into the water and dive to the bottom.

The best method of capturing them under these conditions is to

stalk them with the greatest caution, standing still whenever the toad stops calling — often involving a long and trying wait — moving on again only when he recommences, and, after locating him — no easy matter when he is resting on submerged vegetation with just the head showing above the surface — pounce upon him swiftly by hand. A net was found to be almost useless as it so frequently became fouled in unseen grass beneath the surface. This was the way in which we obtained the toads at Mkonumbi, Peccatoni and Witu. At Laini I captured them at night in the rice fields by the aid of a flashlight.

At Ngatana and Golbanti, these toads were seen hopping about in swamps and marshy spots where they were easier to secure. I set the children to work at catching them in these two places, and the fact that they brought in the Golbanti series in one day shows that the species is by no means so scarce at the right season as its rarity in collections had led me to suppose was the case. I imagine that it burrows during the dry season. The young were taken on paths where they run, seldom hopping, like *B. calamita* which inhabits similar sandy country in Europe.

BUFO LÖNNBERGI NAIROBIENSIS Loveridge

Bufo lönnbergi nairobiensis Loveridge, 1932, Occ. Papers Boston Soc. Nat. Hist., 8, p. 48: Nairobi, Kenya Colony.

3 ♂ 1 ♀ (M.C.Z. 20201-4) Mt. Kinangop, K.C. (H.J.A.T.) 1931.

Variation. I should have expected these to have been referable to the typical form but in practically all measurements they answer to the key (loc. cit., p. 50) characters of the Nairobi race. Thus, third finger included 6.7 to 7.8 times in the length from snout to anus; fourth toe 4.6 to 4.8 times; tibia 3 to 3.2 times.

Measurements. The largest ♂ (M.C.Z. 20202) only measures 28 mm., ♀ (M.C.Z. 20204), largest known, 39 mm.

POLYPEDATIDAE

CHIROMANTIS XERAMPELINA Peters

Chiromantis xerampelina Peters, 1855, Arch. Naturg., 21, part 1, p. 56: Tete and Sena, Mozambique.

Nest and 12 (M.C.Z. 20537-41) Witu, K.C. 30.v.—2.vi.34.

1 (M.C.Z. 20542) Sokoki Forest, K.C. (H.J.A.T.) vi.32.

Variation. The tibiotarsal articulation of the addressed hind limb marks the eye or just beyond. Males with dermal spinosities on dorsum.

Measurements. The largest ♂ (M.C.Z. 20538) measures 56 mm., the only ♀ (M.C.Z. 20539) 67 mm.

Breeding. On May 30, two nests, containing small tadpoles, were found attached to the lower side of a branch of a tree standing near the centre of a large pool. The nests were about five feet above the surface of the water.

On May 31, three very small nests were found attached to the underside of the branches of a large tree which was growing at the edge of another pond. The nests were far out over the water, however, and at heights of from seven to eight feet above it. A fourth, and larger, nest was attached to a dead limb at a height of three feet above the water. A fifth nest was in long grass only six inches above the water. No frogs were seen.

In a third pond near the forest, a small doom palm bore traces of half-a-dozen nests which may have been deposited a month ago, at the commencement of the rains. Six frogs were taken in this bush-like palm. Their capture was a comparatively simple matter for they clung to the sloping, spiny fronds, sidled round them as one approached, but did not leap away until the last moment. If their jump landed them in the pool, as was frequently the case, they soon reappeared, clambered up a grass stem, and were then easily caught. In the rank grass which fringed the pool two large nests, evidently formed the preceding night, were discovered at a height of six inches from the ground.

On June 2, nearly a score of nests in very diverse situations (pl. 1, fig. 2), their height above the water ranging from six inches to five feet, were found in yet another pool formed by the torrential rains. A few frogs were sitting on bare sprays of thorn in the full glare of a noontime sun; this apparently in preference to the shade afforded by the foliage on nearby shrubs and trees. In some instances these frogs were very cryptically colored. On returning to this pool at night, I captured three more males which were sitting on horizontal sprays of bramble and uttering small, rather bird-like, chirruping cries. Within a foot of one was a Spotted Wood Snake (*Philothamnus s. semivariatus*) which may have been stalking the frog.

Diet. Stomachs examined, held: (1) to (4) grasshoppers; (5) grasshopper and two wingless crickets; (6) cockroach; (7) a 42 mm. caterpillar; (8) caterpillar and beetle; (9) small beetles.

LEPTOPELIS CONCOLOR Ahl

Leptopelis concolor Ahl, 1929, Sitz. Ges. Naturf. Freunde Berlin, p. 192: Witu, Kenya Colony.

11 (M.C.Z. 20549-53) Witu, K.C. 3 & 31.v.34.

1 (M.C.Z. 20554) Peccatoni, K.C. 24.v.34.

20 (M.C.Z. 20555-9) Ngatana, K.C. 9-19.vi.34.

7 (M.C.Z. 20560-4) Malindi, K.C. 28.vi.34.

Distribution. Known from the holotype male only. Heard calling at Mkowe, Mkonumbi, Laini, Golbanti, Karawa and Marareni.

Affinities. Among East African *Leptopelis*, this distinctive little species appears to occupy a position intermediate between *bocagii* and *johnstoni*, having the shovel-shaped metatarsal tubercle as well as color and dorsal pattern common to both; it has the reduced webbing of the former, but the well-developed digital disks of the latter.

Coloration in life. Malindi. Above, pale brown or ochre, lighter on sides; a burnt-umber band from nostril, through eye, over tympanum, beyond which it may sometimes be continued as a series of flecks for a very short distance; a triangular marking of paler umber between the orbits, its apex directed posteriorly, and, in occipital region, sometimes giving off diverging lines which may disappear about midbody, but usually persist as a series of flecks which converge upon the anus; similar flecks present on the limbs but most conspicuous on the tibia. Below, white, or colorless except where tinted by the internal organs showing through.

Measurements. The largest ♂♂ in each locality measure 39 mm., the twenty-three males range from 31 to 39 with an average of 36 mm.; largest ♀ (M.C.Z. 20560) measures 42 mm., the nine females range from 36 to 42 with an average of nearly 40 mm.

Breeding. Though males were heard calling from May 3 to June 28, in fact during the whole period of my stay in their district, breeding took place in early May for only one female is gravid, she was taken May 3. Moreover seven young ranging from 19 to 24 mm. were captured at Ngatana in the middle of June, the two smallest had slight rudiments of tails. After the business of breeding is over, the frogs accumulate stores of fat, this is very noticeable in the Ngatana and Malindi series.

Diet. Of ten stomachs examined, six held finely chewed insect remains, consisting, I imagine, of midges and mosquitoes which were abundant in the haunts of these frogs; one held a small moth; another

a sphingid caterpillar 44 mm. in length, its horn alone measuring 8 mm., a remarkable meal for so small a frog.

Habitat. I purposed making a stay at Witu with a view to collecting this species. Two miles out of Witu, however, our truck stuck in tenacious black cotton soil concealed beneath a gleaming sheet of water which appeared, in the moonlight, to extend indefinitely over the water-logged, palm-studded, savanna. Fortunately an island of sandy ground was not far off as it was obvious that we must stay the night. Frogs were calling on every side and amongst the calls was one entirely new to me, it was a very distinctive cry formed of three separate notes. The calls came not only from the swamped lands, but from trees, and at a height of ten feet. I surmised that this songster was the tree frog of which I had come in search. While the boys removed a few essential loads from the truck, I set off in search of the frog. I captured the first within ten feet of the truck, a second in some grass, and a third in a bush, where it was resting at a height of four feet from the ground.

On May 4, at Mkowe, I could hear one calling throughout a torrential downpour. On May 25, at Lake Peccatoni, I set out with a torch and eventually located a male calling from the dead branch of a doom palm where he was sitting seven feet above the ground. With his vocal sac inflated like a great bubble he looked very much like a *Hyla*. The bagginess of the throat serves to differentiate the males at this season, but I imagine that it subsides at the close of the breeding time.

On May 31, back at Witu, I had great sport hunting them down with a torch which was shone in their eyes as they sat in the doom palms. It was always a gamble whether, on reaching the frog which you might have come fifty yards to get, you would find him within reach or high up on some frond.

On June 11, at Ngatana, I took six in half-an-hour. They were calling as they clung to the tall sedges at heights of from four to eight feet.

On June 28, at Malindi, the series was found on aloes at the edge of a swamp.

The question arises as to why this frog, seeing it is so common in the Kenya coastlands, should have escaped collectors and description for so long? I suggest that it will be found that it remains in its burrow (note the shovel-shaped metatarsal tubercle) during much of the year, emerging only when the rains break, a season when Europeans shun this region. The abundant insect life furnishes it with a suffi-

ciency of food to enable it to accumulate stores of fat in preparation for a further period of aestivation. This suggestion is frankly speculative.

LETOPELIS JOHNSTONI (Boulenger)

Hylambates johnstoni Boulenger, 1897, Proc. Zool. Soc. London, p. 803, pl. xlv, fig. 4: Kondowe to Karonga and Nyika Plateau, Nyasaland.

♂ ♀ young (M.C.Z. 20546-8) Ngatana, K.C. 12 & 20.vi.34.

Distribution. These constitute the first records of the occurrence of this species in Kenya Colony.

Variation. The tibiotarsal articulation of the adpressed hind limb reaches the eye in the male, scarcely so far in the female. In the field it was noted that both dorsal and ventral surfaces of the male were noticeably granular in life, they remain so in alcohol.

Coloration in life. ♂. Above, on all surfaces exposed when at rest, olive, concealed surfaces paler; upper lip white, an indistinct dark band, edged with lighter above, from end of snout through nostril, across upper eyelid, to above the tympanum; a dark green area both before and behind tympanum; three dark green cross-bands, irregular in outline, on fore arm and on tibia. Below, white.

♀. Some rich green patches on the dorsolateral stripe. The young one was bright enamel-green above.

I have never noticed any sign of green on Tanganyika frogs, but specimens from Mwaya, which are nearly topotypic with *johnstoni*, agree well with the coloring of the Ngatana series now that they have been in alcohol for two years. The male alone seems rather darker than the male from Mwaya.

Measurements. The ♂ measures 46 mm.; the ♀, 62 mm.; the young one 21 mm.

Breeding. The gonads of both adults are small, while the presence of the young one indicates that the breeding season was past.

Habitat. I captured the male when it was sitting on a shrub in the forest.

HYLAMBATES MACULATUS Duméril

Hylambates maculatus A. Duméril, 1853, Ann. Sci. Nat. (3), 19, p. 165, pl. vii, figs. 1-1b and 4: Zanzibar.

♀ (M.C.Z. 20543) Witu, K.C. 2.vi.34.

♂ ♂ (M.C.Z. 20544-5) Malindi, K.C. 28.vi.34.

Distribution. These constitute the first records of the occurrence of this species in Kenya Colony.

Coloration in life. ♀. Above, black, which on closer inspection will be found to be mottled with an even deeper black, each spot faintly outlined in silver; patches of scarlet on armpit, groin, fore and hind aspects of thigh, inner and upper surfaces of foot. Below, white, so nearly obscured by brown that the sides appear brown finely spotted with white.

Measurements. The ♂ ♂ measure 72 mm., the ♀ only 68 mm.

Breeding. On June 28, at Malindi, I observed a male calling with a bubble-bursting note like that of *Kassina senegalensis*. He was half-submerged, resting on vegetation beneath the shelter of a doom palm in a swamp. The same night I saw the head of a second male just showing above the water in a similar situation; on seizing him I found that he was clasping a female, the latter escaped.

Habitat. Having lifted the dry-grass nest and eggs of a rail from a clump of sedges growing in deep water, I was wading ashore with it resting on the palm of my hand when I felt something moving in the damp sedges which formed the bottom of the nest. On examination it proved to be the female *maculatus* listed above. The nocturnal habitat is described in the breeding note.

KASSINA SENEGALENSIS (Duméril & Bibron)

Cystignathus Senegalensis Duméril & Bibron, 1841, *Erpét. Gén.*, **8**, p. 418: Galam, Senegal.

Cassina Angeli Witte, 1933, *Rev. Zoöl. Bot. Afr.*, **23**, p. 172: Lukafu, Kende-lungu, Belgian Congo.

55 (M.C.Z. 20768-75) Kaimosi, K.C. 15.ii & 6.iii.34.

1 (M.C.Z. 20776) Kibwezi, K.C. 26.iii.34.

1 (M.C.Z. 20777) Peccatoni, K.C. 24.v.34.

125 (M.C.Z. 20778-82) Malindi, K.C. 29.vi.34.

1 (M.C.Z. 20783) Opp. Kilindini, K.C. 6.vii.34.

Synonymy. A ♀ cotype of *angeli* (M.C.Z. 21658) is indistinguishable from some of the females in the Kaimosi series. Its author separated it from *senegalensis* on shorter hind limbs and rugose and strongly denticulated anal flaps. The first of these characters is variable throughout East Africa, both short and long limbed examples of both sexes occurring in the same locality when adequate series are collected. The second character I believe to be a breeding season one, the smooth and scarcely denticulate flaps becoming rough and strongly papillose

in females assembled for breeding. Specifically: ♀ (M.C.Z. 20772) 15.ii.24 (dry season) has smooth anal flaps and the tibio-tarsal articulation reaching her armpit. ♀ ♀ (M.C.Z. 20773-4) and all others taken 6.iii.34 (in pond after rains had broken) are gravid and have rugose anal flaps while the tibio-tarsal articulation reaches the elbow in 3, the armpit in 2.

Variation. One would expect that an eastern race of so widespread a species could be demonstrated; unfortunately we lack topotypic material, our nearest approach to Senegal being Belgian Congo specimens. The name *somalica* Scortecchi might be applicable to such an eastern race, but its status seems doubtful unless almost the whole area of Kenya and Tanganyika is a region of intermediates.

K. somalica was differentiated from *senegalensis* on the following grounds: (1) because the whole of its belly is granular; (2) its interorbital space is $1\frac{3}{4}$ the width of an upper eyelid; (3) its tympanum is $\frac{3}{4}$ the width of the orbit.

The corresponding conditions in *K. senegalensis* are: (1) the antero-central portion of the belly is smooth; (2) the interorbital space is said to equal an upper eyelid; (3) the tympanum is $\frac{2}{3}$ the width of the orbit.

If we take the forty-nine males in the Kaimosi series alone, we find: (1) many have the belly entirely granular while others have the antero-central area smooth as is the case with all females both from Kaimosi and the coast; (2) the interorbital space occupies an intermediate position being about $1\frac{1}{4}$ to $1\frac{1}{2}$ times the width of an upper eyelid; (3) the character is too close to be appreciated when applied to the material.

Coloration in life. ♂. Kaimosi. Above, pale bronze, a dark brown streak from nostril to eye where it is continued along edge of upper eyelid then backwards and downwards; a streak commences between eyes and extends backwards to the region of the coccyx to be followed after an interspace by an azygous blotch slightly to the right and a pair of blotches still further back; on the sides a pair of blotches, one anterior, the other posterior; still lower on flanks numerous irregularly shaped blotches; limbs spotted and blotched; outermost fingers and toes barred. Below, throat black, rest of undersurfaces pure white.

Remarkable variation, however, is exhibited, ranging from those with an almost complete vertebral and dorso-lateral lines to others in which they are broken up into spots. While the latter condition (M.C.Z. 20770) is rare at Kibwezi, it is normal at Malindi but not at other coastal localities to the north or south of Malindi.

Measurements. The largest ♂ ♂ (M.C.Z. 20769) and ♀ ♀ (M.C.Z. 20772), measure 43 mm.

Breeding. On March 3, at Kaimosi, following the breaking of the rains, great numbers of males assembled at the millpond and started calling, previous to this only a single specimen had been obtained (February 15). Not only were five Kaimosi females gravid, but all other adults consisting of one on May 24 at Peccatoni, and two on June 29, at Malindi, emphasizing the difference between the rainy seasons at the coast and in the interior.

Young, ranging in length from 24 to 30 mm., were swarming at Malindi on June 29.

Diet. Stomachs examined, held: (1) many diptera including green-bottle; (2) flies, ants, three caterpillars.

Habitat. The distinctive bubbling notes of these frogs could be heard a mile from the millpond at Kaimosi where the males were often half-submerged as they called. At Peccatoni, not only were they calling from two pools, but some called from thickets and one or two from long grass. There had been heavy rain for sometime past at Malindi, as well as on the very morning when so many young ones were found beneath logs and vegetable debris in a cotton plantation.

MEGALIXALUS FORNASINII (Bianconi)

Euchnemis Fornasinii Bianconi, 1848 (not 1850), Spec. Zoöl. Mosamb., Rept., pl. v, fig. 1: Mozambique.

4 (M.C.Z. 20577-80) Peccatoni, K.C. 24.v.34.

2 (M.C.Z. 20565) Near Witu, K.C. 30.v.34.

5 (M.C.Z. 20566-70) Ngatana, K.C. 19.vi.34.

64 (M.C.Z. 20571-5) Golbanti, K.C. 22.vi.34.

1 (M.C.Z. 20576) Bulfagi Waterhole, K.C. (H.J.A.T.) v.32.

Synonymy. Note correction under *M. brachynemis*. See remarks under the heading of measurements below as to whether an inland race can be recognized.

Coloration. Forty-five of the Golbanti series present a uniform dorsum, in thirty-nine a vertebral streak is present.

Measurements. The figure of the type of *fornasinii* measures 30 mm. On collecting the coastal series listed above, I was struck by their smaller size as contrasted with the extensive collections of montane material available for comparison.

The fourteen ♂ ♂ from the coast range from 26 to 31 mm. (only

one is 31, and one 30 mm.) with an average of 27 mm.; the fourteen largest ♀ ♀ range from 26 to 30 mm. (only two attain 30 mm.) with an average of 28 mm.

Contrast this with the published range and averages of a hundred males and a hundred females from the Uluguru and Usambara Mountains and it will be seen that the coastal frogs average nearly 7 mm. shorter for both males and females respectively, quite an appreciable amount when it is a fifth of the total length.

That it is not a question of montane versus coastal plain, however, seems probable because frogs from Mwaya (on the shores of Lake Nyasa), Kilosa, and Morogogo, attain the proportions of the montane frogs. It is possibly explainable as a coastal plain versus an upland-inland form for which latter the name *loveridgii* Procter is available in a subspecific sense.

Breeding. On May 24, the single adult female taken at Peccatoni, was gravid. Even so late as June 24, some of the Golbanti females had not spawned.

Habitat. All taken on sedges in or around swamps.

MEGALIXALUS FULVOVITTATUS (Cope)

Hyperolius fulvovittatus Cope, 1860, Proc. Acad. Nat. Sci. Philadelphia, p. 517: Liberia.

Hyperolius brevipalmatus Ahl, 1931, Mitt. Zoöl. Mus. Berlin, 17, p. 25: Sangmelina, south Cameroon.

12 (M.C.Z. 20596-600) Kaimosi, K.C. iii.34.

Variation. These frogs have been compared with a topotypic series from Liberia which had previously been compared with what remains of the type. A comparison of Ahl's description and fig. 150 of his *brevipalmatus* (Das Tierreich, 1931, p. 279) with that of *fulvovittatus* given on p. 331, fig. 204 of the same volume, will remove any doubts as to their identity.

Measurements. The largest ♂ ♂ and ♀ ♀ alike measure 28 mm.

Breeding. Nine of the frogs are males, they were found calling in the millpond on the evening immediately succeeding the breaking of the rains.

MEGALIXALUS BRACHYNEMIS Boulenger

Megalixalus brachynemis Boulenger, 1896, Ann. Mag. Nat. Hist. (6), 18, p. 403, pl. xvii, fig. 2: Chiradzulu, Nyasaland.

Hyperolius pygmaeus Ahl, 1931, Mitt. Zoöl. Mus. Berlin, **17**, p. 22: Tanga, Tanganyika Territory.

10 (M.C.Z. 20581-4) Peccatoni, K.C. 24.v.34.

10 (M.C.Z. 20585-9) Near Witu, K.C. 30.v.34.

10 (M.C.Z. 20590-4) Golbanti, K.C. 22.vi.34.

1 (M.C.Z. 20595) Changamwe, K.C. 4.vii.34.

Distribution. Seen also in a pond at Kililana on May 21, 1934.

Corrigenda. In 1933 (pp. 397-398), I compared the description of the type of *Hyperolius pygmaeus* Ahl with M.C.Z. 16805 from Morogoro, and claiming they were the same, referred *pygmaeus* to the synonymy of *M. fornasinii*. While I still think that M.C.Z. 16805 is specifically identical with *pygmaeus*, I must confess to having overlooked the fact that this Morogoro frog was a *brachynemis*, though taken with a long series of *fornasinii* in bananas growing near Morogoro station.

M. brachynemis is so exceedingly like a *Hyperolius* that, without examining their pupils, I again mistook some in the field. The species may, however, not only be distinguished from all other East African *Hyperoli*, but from *M. fornasinii* as well, by its shorter hind limb. In *M. brachynemis* the tibio-tarsal articulation of the adpressed hind limb reaches only to the insertion of the fore arm, or in old softened material, at most scarcely to the hinder corner of the orbit.

Coloration in life. ♂♂. Peccatoni. Above, silvery yellow with irregular longitudinal streaks of brown, a brown streak from tip of snout through nostril and orbit to the groin; tibia silvery yellow obliquely streaked with brown; thighs and feet colorless except for numerous minute black specks and a blood vessel which shows red along the whole length of the thigh. Below, throat yolk-yellow; belly silvery white, *not cream*.

Measurements. The largest ♂♂ from all localities, measure 20 mm.; the largest ♀ (M.C.Z. 20590) is 24 mm.

Breeding. On May 24, at Lake Peccatoni, only males were taken, good evidence that they were just assembling for breeding. On May 30, near Witu, 30% of those taken were females, two of which were gravid. On June 22, at Golbanti, about 70% of the frogs taken were females; most of the adults were gravid, a few presumably had spawned recently.

Habitat. On May 5, a few frogs of both sexes were taken in bananas at Golbanti, as was the case with the male from Changamwe. All the others were taken in pools or swamps where they had assembled for breeding as recorded above.

HYPEROLIUS ROSSII (Calabresi)

Rappia Rossii Calabresi, 1925, Atti. Soc. Ital. Sci. Nat. Milano, **64**, p. 121, fig.: Upper Uele region, Belgian Congo.

Hyperolius phrynoderma Ahl, 1931, Mitt. Zoöl. Mus. Berlin, **17**, p. 71: No locality, but coll. Deut. Zentral-Afrika Expedition.

Hyperolius mohasicus Ahl, 1931, Mitt. Zoöl. Mus. Berlin, **17**, p. 85: Lake Mohasi, Belgian Ruanda-Urundi.

Hyperolius oculatus Ahl, 1931, Mitt. Zoöl. Mus. Berlin, **17**, p. 103: Balaibo, Duki River, w. of Lake Albert, Belgian Congo.

?*Hyperolius irregularis* Ahl, 1931, Mitt. Zoöl. Mus. Berlin, **17**, p. 114: Lake Mohasi, Belgian Ruanda-Urundi.

1 (M.C.Z. 20601) Kirui's Village, K.C. 20.ii.34.

118 (M.C.Z. 20602-14) Kaimosi, K.C. iii.34.

Distribution. In addition to a cotype of *phrynoderma*, a name based on faded material, we have this species from Zambi, Belgian Congo (part of the series referred to *pusillus* Cope by Noble, 1924, p. 256), and Kisumu, Kenya Colony (referred to ? *pusillus* by Barbour & Loveridge, 1930, p. 795). It is evidently a common species in the Central Lake Region.

Variation. The adults are generally recognizable by the numerous fine red spots on the throat, flanks and belly of the females, the dorsum of the males. In the latter, more rarely in the former, they may form the centre of a raised pimple, or the pimple be present without the spot; as the backs of some of the males are smooth; however, it may be a breeding season development. It is the only East African species known to me which has the dorsum so studded; a few species have pimples or granules on the head only.

Coloration in life. ♂. Above, uniformly putty-color except for a very few, scattered, minute, black spines; thighs colorless except for subdermal red areas usually forming four streaks, a similar streak on the inside of the foot, toes also red; shins and outer aspect of feet putty-color but finely flecked with gray. Below, throat and granular abdominal area cream-color, the oval patch surrounded by a grayish area.

♀. Above, head, back, shins and outer aspect of feet cream-color, speckled with numerous, well-defined, small, round, red spots; thighs and inner surface of feet colorless except for subdermal, blood-red streaks and spots. Below, as in male but the whole of the undersurface with scattered dark red spots which are larger than those on the dorsum.

♀. Above, head, back, shins and outer aspect of feet green with numerous large, round, yellow spots each of which has a dark red centre, the yellow spots often coalesce so that the ground color forms a green network about them; shins with only a single spot; thighs and under surface of foot redder than in the other female. Below, as in other female, but throat and abdominal area bright yellowish-green spotted with dark red.

Measurements. The largest ♂ (M.C.Z. 20603) measures 33 mm., the largest ♀ (M.C.Z. 20606) 35 mm.

Breeding. The Kirui and Kaimosi females are gravid, the latter (50) being taken with the males (40) at the millpond where they had assembled.

Enemies. Two were taken from the stomachs of green snakes (*Chlorophis hoplogaster*) and one from a tree viper (*Atheris squamigera*) at Kaimosi, while the Kirui specimen was removed intact from the stomach of a frog (*Rana m. venusta*)!

Habitat. This is definitely a rain-forest form which lives in the tops of the tall forest trees. On March 1 there was a terrific down-pour in the afternoon, on the following day leaves twice came rotating down to my feet from a great height, on each occasion one of these beautiful little frogs was squatting on the leaf.

Folklore. The Maragoli and Watereki adhere tenaciously to a belief that cattle are killed while grazing through inadvertently swallowing these frogs; the frogs are alleged to stick in their throats!

HYPEROLIUS PICTURATUS Peters

Hyperolius picturatus Peters, 1875, Monatsb. Akad. Wiss. Berlin, p. 206, pl. ii, fig. 2: Victoria, Cameroon.

148 (M.C.Z. 20615-9) Kaimosi, K.C. ii-iii.34.

Native names. *Lutu* (Luragoli); *lungala* or *loingolu* (Lutereki, but the former is also applied to ranid frogs).

Affinities. *H. simus* Ahl from Usumbura, northeast of Lake Tanganyika, will probably prove to be synonymous with *picturatus*. In the absence of topotypical material, and in view of his remarks about the coloration of the young, I refrain from synonymizing it at present.

Coloration in life. Most of the adults exhibited a solid, bright red flash on the anterior aspect of the thighs. This greatly assisted in distinguishing them from examples of *rossii*. After preservation in formalin nothing remains of the flash.

Measurements. The largest ♂ (M.C.Z. 20615) measures 32 mm., the largest ♀ (M.C.Z. 20616) 36 mm.

Breeding. On March 3, following the breaking of the rains, males and females were assembling at the millpond.

Habitat. On February 17, I noted that all the *picturatus* were found in wild bananas in the forest, whereas *rossii*, apart from those that fell from the forest canopy, were found in sedges. Later of course both species migrated to the millpond for breeding.

HYPEROLIUS MONTANUS (Angel)

Rappia montana Angel, 1924, Bull. Mus. Hist. Nat. Paris, **30**, p. 269: Mount Kinangop, Aberdare Range, Kenya Colony.

8 (M.C.Z. 16118-23) Mt. Kinangop, K.C. (H.J.A.T.) 1931.

3 (M.C.Z. 20620-2) Uplands, K.C. (C.A. du T.) 1.ii.34.

Distribution. In addition to a cotype, the Museum of Comparative Zoölogy possesses this species from several localities around Mount Kenya.

Affinities. Though subject to wide variation, the color pattern of the young and males show it to be an offshoot of *H. picturatus*.

HYPEROLIUS UNDULATUS (Boulenger)

Rappia undulata Boulenger, 1901, Ann. Mus. Congo (1), **2**, fasc. 1, p. 4, pl. ii, fig. 2: Pweto and Lofoi, Katanga, Belgian Congo.

Rappia symetrica Mocquard, 1902, Bull. Mus. Hist. Nat. Paris, **8**, p. 408: Athi River, Kenya Colony.

Rappia platyrhinus Procter, 1920, Proc. Zoöl. Soc. London, p. 416, fig. 3: Nairobi, Kenya Colony.

Hyperolius asper Ahl, 1931, Mitt. Zoöl. Mus. Berlin, **17**, p. 49; Nairobi, Kenya Colony.

Hyperolius nyassae Ahl, 1931, Mitt. Zoöl. Mus. Berlin, **17**, p. 66: Langenburg (i.e. Manda?), Tanganyika Territory.

3 (M.C.Z. 20623-5) Uplands, K.C. (C.A. du T.) 1.ii.34.

30 (M.C.Z. 20626-31) Nairobi, K.C. 19.iii.34.

2 (M.C.Z. 20632-3) Mt. Mbololo, K.C. 20 & 27.iv.34.

1 (M.C.Z. 21336) Amani, Usambara Mtns., T.T. (R.E.M.) vi.35.

Synonymy. The Museum of Comparative Zoölogy possesses cotypes of *undulatus* and *nyassae*. Ahl's figure (1931, Das Tierreich, p. 340, fig. 213) might almost have come from the same block as his figure (fig. 212) of *symetrica*, both give an excellent representation of the

lateral pattern of the species. The dorsal pattern of a triangular interocular spot and vertebral series of blotches, or a line, may be seen in the figures of *undulatus* and *platyrhinus*. Occasional individuals have these characteristic markings obsolescent, or even absent.

In addition to the synonymy listed above, the Nairobi cotype of Ahl's *pictus* (= *marginatus* Peters) should be referred to *undulatus*. This is apparently also the case with the cotypes of his *breviceps* from Ravine Station, Kenya Colony, a faded cotype (M.C.Z. 17629) of which has been available. It is possible that the type, which came from Tschimbo, Mozambique, is something different.

Coloration in life. ♂ (M.C.Z. 20632). Above, yellowish white, a pigment formed from the concentration of minute brown dots produces a) (shaped mark from the upper eyelids; a very zigzag line from the posterior corner of the eye to the middle of the flank where it terminates; a pair of blotches on the back in lumbar region, and also a cross-bar on the tibia; upper surfaces of hands and feet white flecked and blotched with olive; concealed surfaces red. Below, pure white except for the concealed red surfaces.

Measurements. Adult ♂ ♂ from both Nairobi and Mbololo, 30 mm.; no adult females taken.

Habitat. On March 19, 1934, having had the advantage of heavy showers during the two preceding nights which had brought to an end a prolonged season of drought, I took a car out on the Machakos Road to a spot where the river is choked with sedges and almost stagnant. We arrived half-an-hour before dark, but though five of us searched while daylight lasted, we only succeeded in securing half-a-dozen of these frogs. Most of these were ensconced at the base of the broad leaves of the plant known as *Crinum kirkii* (I am indebted to Miss Napier of the Coryndon Museum for the identification). These flat cool leaves retained a small amount of moisture from the previous showers, in much the same fashion as do the outer leaves of the wild banana plants.

As soon as it became dark, however, these little frogs appeared in such numbers upon the sedges and grasses at the water's edge as enabled us, aided of course by electric torches, to procure the rest of the series in a further half-hour. It seems, therefore, that the majority pass the hot hours of the day concealed deep down in the base of tufts of grass, possibly also on the sedges at water level. Most of the series are young, many still carrying a caudal stump. A single adult *H. striolatus* was taken with them.

One Mbololo male was taken on a papyrus growing in a stream on

the southern slope at 3,000 feet, the other on sedges in a marsh on the eastern side at 4,000 feet.

HYPEROLIUS FLAVOGUTTATUS Ahl

Hyperolius flavoguttatus Ahl, 1931, Mitt. Zoöl. Mus. Berlin, **17**, p. 96: Bukoba, Tanganyika Territory and Mount Kenya, Kenya Colony.

♂ (M.C.Z. 20634) Mt. Mbololo, K.C. 24.iv.34.

Native name. *Kengele* (Kitaita, literally 'a bell' on account of its call, doubtless applied to the preceding species as well).

Affinities. We have one of the faded Bukoba cotypes which bears no resemblance to Ahl's figure in *Das Tierreich*, we have also a topotype from Mount Kenya which does, and with which this species compares tolerably well. Our specimen closely resembles Günther's *reticulatus*, 1860, of no known locality, while the Kenya frog is still more like *Megalixalus flavomaculatus* Günther, 1864, Rovuma Bay.

If Tornier's figures, reproduced by Ahl (1931, *Das Tierreich*, p. 320) as representing *H. taeniatus* Peters of Mozambique do, in reality represent that species, then our Mbololo frog should be referred to *taeniatus*. However, Peters figure of the type from Boror, Mozambique, seems to me possibly to represent a different frog.

Coloration in life. ♂. Above, a *very* dark olive anteriorly becoming progressively paler towards the anus, both head and back handsomely spotted with yellow; thighs pink, except for a subanal area which is cream-colored without markings; tibia like the dorsum; fore limbs and tarsus tend to be cream-colored heavily vermiculated or marbled with brown. Below, gular disk yellowish edged with brown; chest and abdomen pure white; rest of undersurfaces flesh-pink.

Measurement. ♂. 34 mm. as is our Mount Kenya male.

Breeding. Attracted by an explosive whistle, not unlike the bubble note of *Kassina*, I descended from my camp to the marsh where I had caught a solitary male *undulatus* three days before, and captured this lone specimen on a sedge. The only two that called during the week in which I camped at this marsh.

HYPEROLIUS STRIOLATUS Peters

Hyperolius striolatus Peters, 1882, Sitz. Ges. naturf. Freunde Berlin, p. 9: Taita, Kenya Colony.

Rappia ferniquei Mocquard, 1902, Bull. Mus. Hist. Nat. Paris, **8**, p. 407: Athi River, Kenya Colony.

Hyperolius coeruleopunctatus Ahl, 1931, Mitt. Zoöl. Mus. Berlin, **17**, p. 76: Nairobi and Kibwezi, Kenya Colony.

?*Hyperolius pulchromarmoratus* Ahl, 1931, Mitt. Zoöl. Mus. Berlin, **17**, p. 92: Kenya Colony (Hübner legit).

Hyperolius scheffleri Ahl, 1931, Mitt. Zoöl. Mus. Berlin, **17**, p. 11: Kibwezi, Kenya Colony.

1 (M.C.Z. 20635) Uplands, K.C. (C.A. du T.) 1.ii.34.

1 (M.C.Z. 20636) Nairobi, K.C. 19.iii.34.

29 (M.C.Z. 20637-45) Kibwezi, K.C. 23.iii.34.

Synonymy. The Kibwezi series may be considered topotypic of all three species described by Ahl, for Hübner, as well as Scheffler, lived there and I took these frogs from a pond beside the road between the station and their homes. *H. pulchromarmoratus* appears to me to have been based on an individual in which the minute punctatae have coalesced to form short dashes, it is rather more extreme than any in our series, so I am not too certain as to its disposition.

Coloration. Some of the nine young attributed to this species, exhibit traces of the lateral markings associated with *undulatus*. The latter almost certainly occurs at Kibwezi but until definitely proven it seems best to refer the young to *striolatus*.

Measurements. The largest ♂ ♂ (M.C.Z. 20637) measure 34 mm.; the largest ♀ ♀ (M.C.Z. 20638) 36 mm.; the youngest 16 mm.

Breeding. On March 23, at Kibwezi, a tink-tonk call was attributed to this frog; males were assembling and greatly outnumbered the females, only two of which were adult and gravid.

HYPEROLIUS MARIAE Barbour & Loveridge

Hyperolius mariae Barbour & Loveridge, 1928, Mem. Mus. Comp. Zoöl., **50**, p. 217, pl. iii, fig. 1: Derema, Usambara Mountains, T.T.

Hyperolius melanophthalmus Ahl, 1931, Mitt. Zoöl. Mus. Berlin, **17**, p. 68: Zanzibar.

Hyperolius renschi Ahl, 1931, Mitt. Zoöl. Mus. Berlin, **17**, p. 115: Zanzibar.

♀ ♀ (M.C.Z. 21334-5) Amani, Usambara Mtns., T.T. (R.E.M.) vi.35.

Synonymy. Mr. H. W. Parker writes me that he considers *melanophthalmus* a synonym of *mariae*. I have compared a cotype of the former with the type of the latter and entirely agree. In addition I would add *renschii* to the synonymy. Mr. Parker considers the subdermal dark streak on the flank diagnostically important and I am inclined to agree. In this case *fuellborni* from Lake Nyasa, which I placed in the synonymy in 1933, will have to be revived.

HYPEROLIUS VERMICULARIS Ahl ?

Rappia vermiculata Pfeffer, 1893 (1892), Jahrb. Hamburg Wiss. Anst., **10**, part 1, p. 98, pl. i, fig. 12: Zanzibar.

Hyperolius vermicularis Ahl, 1931, Mitt. Zool. Mus. Berlin, **17**, p. 24: n.n. for *R. vermiculata* Pfeffer, 1893, preoccupied by *Hyperolius vermiculatus* Peters, 1882.

5 (M.C.Z. 20646-50) Mkonumbi, K.C. 22.v.34.

152 (M.C.Z. 20651-9) Peccatoni, K.C. 24-26.v.34.

5 (M.C.Z. 20660) Near Witu, K.C. 31.v.34.

1 (M.C.Z. 20661) Golbanti, K.C. 22.vi.34.

2 (M.C.Z. 20663-4) Malindi, K.C. 30.vi.34.

1 (M.C.Z. 20665) Bulfagi Waterhole, K.C. (H.J.A.T.) v.32.

1 (M.C.Z. 20666) Fundi Isa, K.C. (H.J.A.T.) vi.32.

Identification. This is probably the commonest species along the coast; an adequate series having been collected at the outset, further material was only taken for locality record. Its identity with *vermicularis* must remain in doubt, however, until compared with topotypic material from Zanzibar.

Some specimens agree well with Pfeffer's rather poor figure of one of his two somewhat shrivelled types. As these were not males, it is always possible that he had the young of some closely related, but larger, species, such as *sansibarica*. Their smaller size precludes them from being referred to *rubripes* Ahl, from Kililana, just north of Mkonumbi.

Coloration in life. ♂. Lake Peccatoni. Above, olive green to gray green, sides lighter, thighs and feet red, the thighs varying from unpigmented to those which are heavily speckled with black. Below, throat cream or buffy white, flecked with black, the vocal sac an egg-yolk yellow; belly cream; lower surface of limbs transparent pink, flecked along the edges with minute black specks.

A note was made at Malindi that the coloring agreed well with the above. At Mkonumbi it was remarked that these frogs had not red legs like those of *sansibarica*. In the laboratory it is observed that the females are all vermiculated, either darkly or very lightly. While the majority of the males appear uniformly gray in alcohol, the younger ones are often like the females, the pigment being gradually lost, frequently leaving a few irregularly disposed smudges in the lumbar region as in the figure of *petersi* Ahl, from Mombasa, a species that may prove to be synonymous with this material. On sorting the 140 Peccatoni males, 28 are vermiculated, 59 uniform, while 53 might be said to be intermediate.

Measurements. The largest ♂ ♂ (M.C.Z. 20651-2) measure 27 mm., the largest ♀ ♀ (M.C.Z. 20656-7) 28 mm.

Breeding. On May 22, only males were taken at Mkonumbi, where they were calling with an explosive snap; 140 males to only 12 females collected at Peccatoni, indicating that the males were just assembling at the end of May.

HYPEROLIUS SANSIBARICUS (Pfeffer)

Rappia sansibarica Pfeffer, 1893 (1892), Jahr. Hamburg Wiss. Anst., **10**, p. 97, pl. ii, fig. 4: Zanzibar.

Hyperolius rubripes Ahl, 1931, Mitt. Zoöl. Mus. Berlin, **17**, p. 88: Kililana, near Lamu Island, Kenya Colony.

6 (M.C.Z. 20667-9) Mkonumbi, K.C. 22.v.34.

10 (M.C.Z. 20670-4) Peccatoni, K.C. 24.v.34.

12 (M.C.Z. 20675-9) Near Witu, K.C. 30.v.34.

1 (M.C.Z. 20680) Ngatana, K.C. 20.vi.34.

1 (M.C.Z. 20662) Karawa, K.C. 26.vi.34.

1 (M.C.Z. 20681) Malindi, K.C. 29.vi.34.

Synonymy. These frogs have been compared with Pfeffer's types. They are specifically identical with the frogs from Bagamoyo which I (1933, p. 399) referred with a query to *sansibaricus*. Also at least the adult of the two frogs from Dar es Salaam which Barbour & Loveridge (1928, p. 225) identified as *flavoviridis* Peters. The latter name, I am now convinced, was based on a ♂ *argus* Peters of which it should be considered a synonym. They agree in size and color with Ahl's *rubripes* from Kililana, near Mkonumbi, which is now made a synonym. It appears possible that the name *sansibaricus* may have to be synonymized with *citrinus* Günther from the Zambesi.

Coloration in life. ♂. Mkonumbi. Above, pale yellowish green becoming yellower on the limbs; thighs and lower surface of tibia blood-red. Below, throat yellow; chest cream-color.

♂. Peccatoni. Above, uniform rich green (rapidly becoming yellowish green after death) on head, back, tibiae and exposed outer edges of arms and feet (under a lens the tibiae are seen to be minutely dotted with black); thighs, extending backwards to inner anterior surface of tibiae, as well as the concealed upper surface of feet, blood-red. Below, throat yolk-yellow; belly cream-color.

♀. Peccatoni. Above like male, but below the throat is cream-color instead of yellow.

Measurements. The largest ♂ (M.C.Z. 20681) measures 31 mm.; the largest ♀♀ are 32 mm.

Breeding. On May 22, at Mkonumbi, males only were taken, their cry an explosive snap like that of the preceding species. Two days later, at Peccatoni, I found a female on her mass of eggs which were wrapped about the stem of a reed at a height of eight inches above the surface level of a pond, that was being daily augmented by the torrential rains. On May 31, near Witu, many masses of spawn were found in swamped grassland at a height of six inches above the water; it is possible that some were laid by the previous species — *vermicularis*.

HYPEROLIUS PUNCTICULATUS (Pfeffer)

Rappia puncticulata Pfeffer, 1892 (1893), Jahr. Hamburg Wiss. Anst., **10**, part 1, p. 31, pl. ii, fig. 2: Zanzibar.

Hyperolius noblei Ahl, 1931, Mitt. Zoöl. Mus. Berlin, **17**, p. 118: Kilwa, Tanganyika Territory.

♀ (M.C.Z. 20701) Malindi, K.C. 28.vi.34.

Synonymy. From the description I see no reason for regarding *noblei* as distinct. The Kilwa fauna is that of the coastal plain with an admixture of species such as *Spacleophryne methneri* known only from near Kilwa and the Uluguru Mountains, where *H. puncticulatus* is so abundant.

Coloration in life. Above, straw yellow, a broad, dusky canthal band.

Measurements. ♀ measuring 37 mm.

Habitat. Taken the same evening, and in the same pond, as the males of *H. ahli* sp. nov., from which it differed in the absence of spotting and not having a green ground color.

HYPEROLIUS ARGENTOVITTIS Ahl

Hyperolius argentovittis Ahl, 1931, Mitt. Zoöl. Mus. Berlin, p. 72: Ujiji, Lake Tanganyika, Tanganyika Territory.

Hyperolius callichromus Ahl, 1931, Mitt. Zoöl. Mus. Berlin, p. 99: Western Bank of Rusisi River and northwest shore of Lake Tanganyika, Belgian Congo.

Synonymy. The Museum of Comparative Zoölogy possesses a topotype of *argentovittis* and cotypes of *callichromus*. It was unfor-

tunate that in using the name *callichromus* in 1933 (p. 403) I failed to realize that *argentovittis* was only an example in which the spots had coalesced to form stripes. It can be matched in our extensive series from Lake Tanganyika, though the Ujiji topotype is typically *callichromus* in its blotches.

I might mention that the Museum possesses a poorly preserved frog (M.C.Z. 20700), collected by Mr. H. J. Allen Turner at Kaimosi, which has only the silvery, black-edged, lateral streaks, the back being uniform. It probably represents some different form and is not referred to *argentovittis*.

HYPEROLIUS AHLI sp. nov.

Hyperolius argus Loveridge (part, not of Peters), 1925, Proc. Zool. Soc. London, p. 788: Tindiga and Kipera, near Kilosa, Tanganyika Territory.

Hyperolius callichromus Ahl (part), 1931, Mitt. Zool. Mus. Berlin, 17, p. 99: Kililana, Kenya Colony; Dar es Salaam, etc., Tanganyika Territory.

♀ (M.C.Z. 10435) Tindiga, T.T. 23.vii.21.

♀ (M.C.Z. 10438) Kipera, T.T. 5.v.23.

♂ (M.C.Z. 20901) Dar es Salaam, T.T. 9.xi.26.

1 ♂ 3 ♀ (M.C.Z. 20682-4) Peccatoni, K.C. 24.v.34.

10 ♂ 8 ♀ (M.C.Z. 20685-9) Near Witu, K.C. 31.v.34.

8 ♀ (M.C.Z. 20690-4) Golbanti, K.C. 22.vi.34.

5 ♂ 3 ♀ (M.C.Z. 20695-7) Malindi, K.C. 28.vi.34.

2 ♀ (M.C.Z. 20698-9) Marafa, K.C. (H.J.A.T.) v.32.

Remarks. It may be recalled that when Dr. Ernst Ahl described *callichromus* from the Rusisi River and localities northwest and northeast of Lake Tanganyika, he listed other paratypes from Kililana in Kenya, Kawenda, Bagamoyo and Dar es Salaam in Tanganyika Territory. He remarked that the Dar es Salaam frogs differed in color pattern from the Lake specimens in certain ways, but that he had insufficient material to say whether these individuals represented a distinct form or not.

Having collected *puncticulatus* at Dar es Salaam, I made the mistake of assuming that the material would only be variants of that variable form and I (1933, p. 406) referred this part of *callichromus* to the synonymy of *puncticulatus*. With the fresh material now at my disposal I humbly apologize for my error and take pleasure in associating the name of Dr. Ahl with this new form which links *argentovittis* (inc. *callichromus*) and *puncticulatus* in which the sexes are alike, with *argus* which displays such remarkable sexual dichromatism.

In this connection it might be interesting to remark that in the field I provisionally listed the spotted females as *callichromus*, and the green males as a species unknown to me. On my return to Cambridge I spent a day in unsuccessfully endeavouring to identify the males with some known species. A week later, when measuring the spotted forms, I was astonished to find that all twenty-four were females. Parker's interesting discovery of the sexual dichromatism in *argus* then occurred to me, while on referring to his colored plate (1931 (1930), Proc. Zool. Soc. London, p. 902, pl. i) I was immediately struck by the close parallelism in coloring between the sexes of *argus* and *ahli*.

I might here state that Peters founded *argus* on a female, while later in the same paper his *flavoviridis* and *tettensis* were undoubtedly males and so become synonyms of *argus*.

Type. Museum of Comparative Zoölogy, No. 20,682, an adult ♂ from Lake Peccatoni, northeast of Witu, coast of Kenya Colony, collected by Arthur Loveridge.

Paratypes. The rest of the material listed above.

Diagnosis. A large species related to *puncticulatus*, but occupying an intermediate position between *argentovittis* Ahl and *argus* Peters. From the latter the male differs in little but size, the female, however, differs from female *argus* in the limbs being usually spotted like the dorsum and the spots on both being white-centred instead of yellow.

Neither sex of *ahli* have a color pattern of a white (or silvery) vertebral line or series of spots, while the females have large spots or black-edged reddish-brown streaks on the limbs like those on the dorsum, instead of small black specks as is the case with *argentovittis*.

Coloration in life. ♂ *Type.* Peccatoni. Above, all exposed surfaces green including the thighs, which, with the feet, are paler than the back; head, back, fore arms and tibiae dotted with black; a light green line, extending from orbit to two-thirds of the distance to the groin, is faintly indicated. Below, green, though gular disk, chest and belly are slightly cream-color; groin, knees, and other joints are bluish green; hands and feet tinged with yellow.

♀ *Paratype.* Peccatoni. Above, olive, following the contour of the snout from its end backwards to, and around, the eyes, a broad V-shaped mark which, with a lateral streak, two azygous spots on dorsum, a supra-anal spot, two spots on fore arm and three on tibia, are pure white edged with black; hands, thighs and feet, pale red. The number and arrangement of these spots, which at times coalesce

to form bars, are subject to infinite variation, yet never form a vertebral row or streak.

Coloration in alcohol. ♂ Type. Above, flesh-color, the black dots now dusky, as is also a rather faint canthal band from nostril to eye which was not noticeable in life. Below, lighter flesh-color. Some of the paratypes are uniform, others show a light, canthal-lateral band which is edged above and below with a series of dusky dashes.

♀ Paratype. Above, pinkish brown, the markings pale flesh-color heavily edged with black. Below, light flesh-color.

Measurements. ♂ Type measures 35 mm. from snout to anus, the sixteen paratype ♂ range from 32 to 37 mm. with an average of 34 mm.; the ♀ paratype whose coloration is described above, measures 31 mm., the largest of twenty-six ♀ measures 35 mm.

Habits. Apparently these frogs remain under water during the day for in half-an-hour spent wading about in a pond covered with lily pads at Witu, only one was seen. Continuing over the same area immediately after sunset, more than a dozen were disturbed. The males went leaping and splashing across the surface in a characteristic fashion. Females, despite their conspicuous coloring, are very wary, plunging into the water and swimming away while one is still far distant.

HYPEROLIUS PARKERI Loveridge

Hyperolius parkeri Loveridge, 1933, Bull. Mus. Comp. Zool., **74**, p. 140: Bagamoyo, Tanganyika Territory.

7 ♂ (M.C.Z. 20702-6) Peccatoni, K.C. 24.v.34.

4 ♂ 5 ♀ (M.C.Z. 20707-8) Near Witu, K.C. 30.v.34.

1 ♀ (M.C.Z. 20709) Ngatana, K.C. 13.vi.34.

1 ♀ (M.C.Z. 20710) Golbanti, K.C. 22.vi.34.

4 ♂ 1 ♀ (M.C.Z. 20711) Bulfagi Waterhole, K.C. (H.J.A.T.) v.32.

Secondary sexual character. In addition to the color differences noted in the original description, it is now observed that these breeding males have a patch of black spines at the hinder part of the abdomen, lower surface of thighs and soles of feet.

Coloration in life. Of the Ngatana female (possibly applicable to all) it was noted that it was entirely green beneath.

Measurements. The largest ♂ (M.C.Z. 20702) measures 26 mm., range of fifteen males 20-26 mm., average 23 mm.; the largest ♀ (M.C.Z. 20707) measures 23 mm., range of eight females 18-23 mm.,

average 21 mm. It seems highly probable, therefore, that in this species the male may attain larger dimensions than the female.

Breeding. On May 24, at Lake Peccatoni, males were assembled but no females encountered; a week later at Witu, gravid females were present in proportions at least numerically equal to the males.

HYPEROLIUS NASUTUS Günther

Hyperolius nasutus Günther, 1864, Proc. Zoöl. Soc. London, p. 482, pl. xxxiii, fig. 3; Duque de Braganca, Angola.

Rappia granulata Boulenger, 1901, Ann. Mus. Congo (1), 2, fasc. 1, p. 4, pl.

ii, fig. 3; Pweto, Lake Mweru, Belgian Congo.

1 ♂ (M.C.Z. 20725) Mkonumbi, K.C. 22.v.34.

22 ♂ 9 ♀ (M.C.Z. 20726-33) Peccatoni, K.C. 24.v.34.

3 ♀ (M.C.Z. 20734-6) Near Witu, K.C. 30.v.34.

1 ♂ (M.C.Z. 20737) Golbanti, K.C. 22.vi.34.

Synonymy. I feel convinced that the unique type of *granulata* was a *nasutus*, probably formalin preserved, for such, even though transferred to alcohol at an early date, do not exhibit the silvery naso-orbital-lateral stripe. It appears rather as a flesh-colored stripe which is free from the minute specks, that, concentrated above and below, tend to accentuate it. In our material it is even less distinct in the females which have a slightly less prominent snout. See remarks under *granulatus* in Loveridge (1933, p. 410).

For comparative material I have a ♂ from Ngola, Angola, determined as *nasutus* by Boulenger; the two ♀ ♀ from Nyamkolo, thirty miles from the type locality of *granulatus*; a ♀ from Kabengere and a juvenile from Elizabethville, both in Belgian Congo; and a ♀ from Kibonoto, Mount Kilimanjaro which was one of the series incorrectly referred to *puncticulatus* by Lönnberg (1907, p. 25).

Coloration in life. ♂. Mkonumbi. Above, green, a white lateral stripe from eye only, is black-edged.

♀. Near Witu. Above, green, a small vermilion blotch on the anterior surface of each thigh. Throat green. (Eggs visible).

Breeding. On May 24, at Peccatoni, all the females were gravid; a week later, at Witu, this condition prevailed.

Measurements. The twenty-three males measure 20-24 mm., average 22 mm.; the twelve ♀ ♀ range from 19-26 mm., average 23 mm.

HYPEROLIUS MILNEI Loveridge

Hyperolius milnei Loveridge, 1935, Bull. Mus. Comp. Zoöl., **79**, p. 18: Near Witu, Coast Province, Kenya Colony.

12 (M.C.Z. 20712-8) Kililana, K.C. 21.v.34.

75 (M.C.Z. 20025-50) Near Witu, K.C. 31.v.34.

2 (M.C.Z. 20051-2) Golbanti, K.C. 22.vi.34.

1 (M.C.Z. 20053) Malindi, K.C. 28.vi.34.

1 (M.C.Z. 20719) Sokoki Forest, K.C. (H.J.A.T.) vi.32.

Affinities. Apparently closely related to *albofrenatus* Ahl from Tanganyika Territory, but differs in not being silvery white nor possessing a large silvery white subocular spot. On the other hand *milnei* normally possesses a dark canthal stripe which appears to be lacking in *albofrenatus*.

Coloration. The Kililana frogs were not designated as paratypes as they lack both the canthal stripes and conspicuous dorsal spotting which characterize the Witu series, to which, perhaps, they should not be referred. The coloring in life, however, points to the probability that they should be regarded as a single species.

Breeding. On May 21, at Kililana, males outnumbered females two to one, the females were gravid and spawn was seen upon the submerged vegetation. On May 31, at Witu, dozens of gravid females were taken. On June 28, at Malindi, a male was heard calling and many of the species seen.

Habits. At Kililana, these frogs were taken in a swamped mbugwe about a mile from the site of the German planter's house. Here, at midday, these rich green frogs with a pale yellow lateral stripe, were found squatting on the blades of water-logged grass in the larger pools. As often as not the grass would be lying on the surface of knee-deep water, and, as one approached, the frog would dive off, seldom reappearing.

At Witu, these small frogs were found sitting on the numerous lily pads and blades of grass lying on the surface of a lake a mile or so from Mr. Milne's house. By day they were very alert, leaping and swimming away long before one was within reach of them. It was noted that in this lake, they did not remain below the surface, but after swimming a short distance, scrambled out on to a lily pad with alacrity. The difference in their behaviour to that of those at Kililana, may possibly be accounted for by the presence of numerous cat fish at Witu; in fact, as I waded about almost waist-deep, I trod on

several while others collided with my legs. As dusk descended these frogs began calling vociferously, and it was then found that they might be captured with relative ease by a swoop of the hand.

Enemies. One was recovered from the stomach of an Olive Water Snake (*Natrix o. olivaceus*) at Golbanti on the Tana River.

HYPEROLIUS PUSILLUS (Cope)

Crumenifera pusilla Cope, 1862, Proc. Acad. Nat. Sci. Philadelphia, p. 343: Umvoti, Natal.

Hyperolius microps Günther, 1864, Proc. Zoöl. Soc. London, p. 311, pl. xxvii, fig. 3: Rovuma Bay, East Africa.

Hyperolius usaramoae Loveridge, 1932, Proc. Biol. Soc. Washington, **45**, p. 63: Mogogoni Swamp, south of Dar es Salaam, Tanganyika Territory.

Hyperolius translucens Power, 1935, Proc. Zoöl. Soc. London, p. 339, figs. 6-7, pl. i, figs. 3-4; Port St. Johns, Pondoland coast, Union of South Africa.

5 ♀ (M.C.Z. 20720-4) Golbanti, K.C. 22.vi.34.

Synonymy. Recently, through the generosity of Mr. J. H. Power, we received a series of paratypes of his *translucens* with both sexes represented. I recognized them immediately as being similar to my *usaramoæ* and careful comparison with the types failed to find any differences whatever. If the published accounts of the color in life, as given by Power and myself, be compared, it will be seen that they undoubtedly refer to the same species.

Whereas Barbour & Loveridge (1928, p. 225) originally referred the types of *usaramoæ*, together with some other frogs, to *microps*, it later became apparent that there were two species and regarding the 'other frogs' as *microps* (which they were not, they were later described under the name of *parkeri* Loveridge), I proceeded to describe the real *microps* material as *usaramoæ*.

As Port St. Johns is not far distant from Umvoti, Natal, before reading Mr. Power's description of *translucens*, I compared his paratypes with the description of *pusillus* and decided that they represented the same creature. Later, on looking up the original description, I saw that Power, himself, suggested that possibility.

An important aid to the identification of this species, at least it is present in our Kenya, Tanganyika and Pondoland material, is the presence of two bright, light, transverse, subdermal streaks on the occiput just between, and slightly posterior to, the eyes.

Measurements. These five females range from 20-21 mm.

Breeding. They are not gravid.

RANIDAE

RANA EDULIS (Peters)

Pyxicephalus edulis Peters, 1855, Arch. Naturg., **21**, part 1, p. 56: Boror and Tete, Mozambique.

Phrynopsis Boulengeri Pfeffer, 1893 (1892), Jahrb., Hamburg Wiss. Anst., **10**, p. 101, pl., ii, figs. 5-6: Mozambique.

Pyxicephalus flavigula Calabresi, 1916, Monit. Zoöl. Ital., **27**, p. 34, pl. ii, fig. 1: Orofillo, Italian Somaliland.

Phrynopsis usambarac Ahl., 1924, Zoöl. Anz., **60**, p. 271: Usambara, Tanganyika Territory.

40 juv. (M.C.Z. 20219-23) Mkonumbi, K.C. 22.v.34.

11 juv. (M.C.Z. 20224-8) Peccatoni, K.C. 23.v.34.

3 (M.C.Z. 20229-31) Near Witu, K.C. 30.v.34.

1 (M.C.Z. 20232) Golbanti, K.C. 22.vi.34.

1 (M.C.Z. 20233) Karawa, K.C. 26.vi.34.

1 (M.C.Z. 20234) Gongoni, K.C. 27.vi.34.

2 (M.C.Z. 20235-6) Mombasa Id., K.C. 3.vii.34.

5 (M.C.Z. 20237-8) Mainland opp. Kilindini, K.C. 6.vii.34.

Synonymy. In 1882, Boulenger referred *edulis* to the synonymy of *adpersa* Duméril & Bibron, thereafter all workers, including myself, have referred their Tanganyika and Kenya material to *adpersa*.

In 1929, I began to be puzzled that no East African specimens exceeded 138 mm. in length, *i.e.* only about half the size of the South African *adpersa*. In 1934 I obtained gravid females of small size and found the species occurred all the way up the coast to Lamu, *i.e.* just south of the Italian Somaliland border.

Pfeffer based his genus *Phrynopsis* on the cartilaginous omosternum and sternum. When I received the types for examination from Herr de Grijns I immediately recognized them as the young of *edulis*. The genus *Phrynopsis* therefore becomes a synonym of *Rana* or rather its subgenus *Pyxicephalus*.

Peters characterized *edulis* as having a hind limb equal to the body length, Miss Calabresi also only mentions the shorter length of the hind limb as separating *flavigula* from *adpersa*. On reinvestigating the status of these frogs, I conclude that all East African records should be transferred to *edulis*, and *adpersa* struck off the East African list.

Rana edulis differs from *adpersa* in much smaller size; slightly shorter hind limbs; slightly longer toes; a smoother, less rugose, integument. Doubtless its coloration differs also, a green dorsal stripe is characteristic.

While the upper lip is usually marmorate, it is uniformly white in *usambaræ* and in some frogs from Kilosa and Dar es Salaam in the Museum of Comparative Zoölogy.

Measurements. The largest ♂ (M. C. Z. 20229) measures 98 mm., the largest ♀ (M. C. Z. 20230) 76 mm.

Breeding. On May 30, near Witu, I took three of these frogs in a pool where they had undoubtedly gone to breed; of the pair whose measurements are given above, the ♀ was gravid with spawn. Young, about 32 mm. in length were swarming at Mkonumbi, Peccatoni and Golbanti. The Karawa, Gongoni and Mombasa frogs were halfgrown. Youngest of all were the Kilindini series just out of the tadpole stage and about 10 mm. long.

Diet. So voracious were these little creatures that two of them, despite the fairly rapid action of the potassium cyanide, when dropped into a killing bottle, seized, and partly swallowed, two of their fellows. At Lake Peccatoni, a young *Rana m. mascareniensis* was recovered from the stomach of an *edulis* scarcely larger than itself. The Witu female held a leaf frog (*Hyperolius* sp.), a small crab (presumably *Potamon bottegoi*), a yellow millipede, carabid and other beetles as well as the remains of various insects.

Enemies. A young *edulis* was recovered from the stomach of a Stripe-bellied Sand Snake (*Psammophis subtaeniatus*) at Mkonumbi.

RANA OCCIPITALIS Günther

Rana occipitalis Günther, 1858, Cat. Batr. Sal. Brit. Mus., p. 130, pl. xi: "Africa", "West Africa", "Gambia".

1 (M.C.Z. 20238) Mt. Debasien, U. 24.xi.33.

Habitat. This young, 62 mm., frog, was taken among long grass in the Amaler River at an altitude of 5,000 feet.

RANA FUSCIGULA CHAPINI Noble

Rana chapini Noble, 1924, Bull. Am. Mus. Nat. Hist., 49, p. 214, fig. 6a: Batama, Belgian Congo.

10 (M.C.Z. 20261-5) Mt. Debasien, U. 20.xi.33.

5 (M.C.Z. 20280-4) Sabei, Elgon, U. 9.xii.33.

12 (M.C.Z. 20239-4) Butandiga, U. 8.i.34.

Tadpoles & 4 (M.C.Z. 20245-9) Buluganya, U. 12.i.34.

1 (M.C.Z. 20250) Budadiri, U. 17.i.34.

84 (M.C.Z. 20285-9) Kaimosi, K.C. ii.34.

11 (M.C.Z. 20251-9) Nairobi, K.C. 17.iii.34.

1 (M.C.Z. 20260) Mt. Mbololo, K.C. 20.iv.34.

Distribution. These records serve to fill the hiatus between the Belgian Congo and Nairobi, Usambara and Uluguru mountains from which this form is known. For comments on the occurrence of this race and *R. f. angolensis* at Kaimosi, see remarks under that form.

Native names. *Akidot* (Karamojong); *lungalla* (Luragoli and Lutereki); *chula* (Kitaita), but none specific.

Measurements. The largest ♂ (M. C. Z. 20248) measures 72 mm., the largest ♀ (M. C. Z. 20245) 98 mm., next largest ♀ (M. C. Z. 20260) 90 mm.

Breeding. On January 12, at Buluganya, males were heard calling, and a series of tadpoles about 65 mm. in length were collected. In February, at Kaimosi, only two young frogs had rudiments of tails, these two frogs measured 43 (27 + 16) and 74 (43 + 31) mm. respectively. On March 17, two of the frogs in the Nairobi series exhibited tails in various stages of absorption, the longer tail measuring 28 mm.

Parasites. Encysted nematodes are present on the top of the head of the large Buluganya female, and what appear to be ruptured capsules are present on the palms of her hands. Another female (M. C. Z. 20239) from Butandiga, has lost the toes of one foot entirely, possibly from a similar infection?

Enemies. One frog was recovered from the stomach of a tree snake (*Hapsidophrys lineata*).

Habitat. In streams associated with montane forest from 7,000 feet (Butandiga) to 4,000 feet (Mbololo) except for those in a deep pool at Buluganya. This pool was at the foot of a hundred-foot cliff over which a stream spilled into the pool. Six frogs were observed on the shallow edges of the pool; they were very wary, however, and dived into the deep mud when approached. Those from Mount Debasien were found sitting in the shallows of the Amaler River at 5 a.m. I captured them by shining their eyes with an electric torch.

RANA FUSCIGULA ANGOLENSIS Bocage

Rana angolensis Bocage, 1866, Journ. Sci. Math. Nat. Phys. Lisboa, p. 73:
Duque de Bragança, Angola.

2 (M.C.Z. 20266-7) Sipi, U. 14.xii.33.

Tadpoles & 4 (M.C.Z. 20268-72) Kaburomi, U. 28.xii.33.

24 (M.C.Z. 20273-9) Kaimosi, K.C. ii.34.

Distribution. A frog, almost certainly this species, sprang into a stream at Madangi, 11,500 feet, on Mount Elgon, Uganda.

While the preceding race is usually associated with forest streams,

angolensis is an upland, open-country form. It was surprising, therefore to find it at Sipi, on western Elgon, between Sabei to the north and Butandiga to the south where undoubted *chapini* occur. It may be assumed that it has followed the course of the Sipi River and its tributaries up to Kaburomi which is in the alpine-meadow zone.

The Kaimosi specimens are also of considerable interest as both races occur in the vicinity. Much deforestation has taken place and today patches of forest abut on the grasslands. I personally collected some *fuscigula* (presumably *chapini*) along a stream flowing through dense primary forest, but most of the series of 104 frogs from Kaimosi were brought in by native children, so that speculation as to whether they were procured within or without the forest would be idle. Many in the *chapini* series are intermediate as the webbing on the fifth toe extends scarcely to the tip (vide key in Loveridge, 1933, p. 364), it seems highly probable that the two forms are meeting and interbreeding in this area as the savanna encroaches on this one-time forested country.

Native names. *Isodo* (Lugishu).

Measurements. The largest ♂ (M. C. Z. 20268) measures 55 mm., the largest ♀ (M. C. Z. 20266) is 64 mm., Kaimosi females only a millimetre less.

Breeding. On December 28, in an icy-cold stream at 10,500 feet at Kaburomi, tadpoles and young in all stages of development, together with four adult males, were taken.

Diet. Stomachs of ten Kaimosi frogs held: (1) many moths; (2) moths; (3) moths, ant, and many flies; (4) moths, muscid fly, green-bottle fly; (5) five greenbottle flies, two large black flies, two tumbo flies, ichneumon or slender-waisted wasp; (6) flies; (7) flies and beetles; (8) beetle and hemipteron; (9) cricket, beetles and millipede; (10) ants of a huge black species, neuropteran, millipede.

Habitat. At Sipi in a shallow stream flowing through native gardens in open, though formerly forest, country. At Kaimosi as they sat on the edge of the millpond at night, I captured them by shining their eyes with an electric torch.

RANA WITTEI (Angel)

Phrynobatrachus Wittei Angel, 1924, Bull. Mus. Hist. Nat. Paris, **30**, p. 130: Molo, Mau Escarpment, Kenya Colony.

Rana aberdariensis Angel, 1925, in Voyage de Ch. Alluaud et R. Jeannel en Afrique Orientale (1911-1912), Paris, p. 42, pl. ii, figs. 1 & 2: Mount Kinangop, Aberdare Mountains, Kenya Colony.

3 ♂ (M.C.Z. 20290-2) Molo, K.C. 12.iii.34.

Distribution. These topotypes of *wittei* are from a locality little more than fifty miles from the type locality of *aberdariensis*.

Synonymy. *R. wittei* was referred to the genus *Phrynobatrachus* by its author as the type lacked vomerine teeth. As this is also a condition common to very young frogs of the genus *Rana*, I (1930, p. 31, footnote) suggested that *wittei* was a young *Rana*, but hesitated to refer it to any species on account of its dried condition.

I find Angel's description of *wittei* coincides with these three males except that (1) the tympanum almost equals the orbital diameter in our material; (2) the length of the tibia is included in the length from snout to anus from $1\frac{3}{4}$ to $2\frac{1}{4}$ times instead of $2\frac{1}{2}$ times in the type, but $2\frac{1}{4}$ times in the figure of the type (*vide* second citation, pl. iii, fig. 5); (3) the skin is not smooth above like the smooth skin of the type.

These topotypes of *wittei* have the characteristic pigmented gular sacs of *aberdariensis* with a cotype of which they have been compared. Curiously enough, after just writing the foregoing, and coming to the conclusion that the two species are synonymous, I turned up some manuscript notes written in Paris in 1927, after examining the type of *wittei*. One reads "? a young *Rana*, very like the young of *Rana aberdariensis*." This suggestion had entirely escaped my memory; now nine years later the same conclusion is arrived at when approached from a different angle.

Coloration. Throats chrome yellow.

Breeding. The dusky vocal sac, thickened forearm, swollen base of first digit, in conjunction with minute dermal spines on soles of hind feet, outer side of shanks, inner and outer aspects of thighs, abdomen and back, proclaim these breeding males. They were taken just at the end of a prolonged dry season, the rains usually breaking in April in this locality.

Habitat. We arrived at the Highland Hotel, Molo, at 7 p.m., after an eleven-hour truck ride from Kaimosi. It was already dark, but as we must start soon after daybreak next morning, I went out with a flashlight at 8.30 p.m. and made my way in the direction of a solitary frog-call. Eventually I captured these specimens in a cattle-trampled, boggy, yet slowly-flowing stream beside the bridge immediately below the Hotel on the Londiani-Molo Road. Next morning my wife searched the same spot and secured several *Phrynobatrachus keniensis*.

RANA GALAMENSIS BRAVANA (Peters)

Limnodytes bravanus Peters, 1882, Sitz. Ges. naturf. Freunde Berlin, p. 3:
Barawa, i.e. Brava, Italian Somaliland.

1 (M.C.Z. 20293) Kirimanda River, K.C. 3.v.34.

2 (M.C.Z. 20294-5) Peccatoni, K.C. 25.v.34.

7 (M.C.Z. 20296-7) Golbanti, K.C. 22.vi.34.

4 (M.C.Z. 20298-300) Malindi, K.C. 28.vi.34.

Native name. *Malondi* (Kipokomo).

Variation. Reasons for recognizing *bravana* as the name applicable to the eastern form have been given in my report on the Field Museum African Collections (1936, p. 95).

The tibiotarsal articulation of the adpressed hind limb reaches the eye in all specimens (5 ♂♂, 8 ♀♀) except a juvenile male from Golbanti.

Coloration in life. ♂ Malindi. Above, greenish yellow, obscured anteriorly by burnt umber which takes the form of an undulating vertebral line on the forward part of the back, and irregular blotches posteriorly; flanks and thighs beautifully marbled with burnt umber on a cream-colored ground; tibia and fore limbs colored like the sacral region but with a few blotches on the fore arms; fingers cream color; toes whitish. Below, white, the gular sacs black; the pads on the upper arm cream-colored; limbs exhibiting subdermal mottling; soles of hands and feet gray.

The ♀ coloring is essentially like that of the ♂ but for the absence of vocal sacs and arm pads. Based on a pair from Malindi.

Measurements. The largest ♂ (M. C. Z. 20298) and ♀ (M. C. Z. 20299) both measure 75 mm.

Breeding. On June 28, males at Malindi were calling 'ku-wek', yet readily distinguishable from the call of *R. m. mascareniensis*, as they rested on submerged vegetation in deep water sheltered by a small doom palm.

Diet. Stomachs examined, held: (1) grasshopper; (2) grasshopper, large hairy caterpillar with stiff hairs; (3) orthopteran limbs, 40 mm. long wings and body of agrionid dragonfly; (4) agrionid dragonfly, spider; (5) larval dragonfly, spider; (6) three earwigs, spider; (7) large black cricket; (8) rat-tailed maggot, staphylinid beetle, spider; (9) fossorial wasp with sting extruded, bombardier beetle, small skipjack and other beetles; (10) three woodlice. This frog appears to feed on a great variety of unpleasant creatures. I recovered a scorpion (*Isometrus maculatus*) from a Bagamoyo specimen.

Habitat. The specimen from the bed of the Kirimanda River was disturbed by the whirring wheels of our truck which was bogged in the black cotton soil. I shot the first Peccatoni male as it sat on some floating bark five feet from the edge of the pool. The second I seized at night by shining its eyes as it sat on some floating reeds in knee-deep water. The Golbanti series were captured beneath masses of wet, recently-cut sedges near the water's edge.

RANA FLOWERI Boulenger

Rana floweri Boulenger, 1917, Ann. Mag. Nat. Hist. (8), **20**, p. 417: Rosaires, Blue Nile, Anglo-Egyptian Sudan.

Rana erlangeri Ahl, 1923, Mitt. Zool. Mus. Berlin, **11**, p. 5: Lake Abaya, north-east of Lake Stephanie, Ethiopia.

7 ♂ + 16 young (M.C.Z. 20398-402) Peccatoni, K.C. 24.v.34.

2 ♀ (M.C.Z. 20403-4) Ngatana, K.C. 9.vi.34.

Variation. The tibiotarsal articulation of the adpressed hind limb reaches the eye in the nine adults, the eye or a little beyond in the young; fourth toe with two phalanges free of web, remaining toes with one phalanx free, or almost free, of web.

Coloration. Considerable difficulty was experienced in separating these short-limbed frogs from some of the *mascareniensis* taken in the same swamp. The following pattern characters proved helpful. *R. floweri* has finer vermiculations on the buttocks; though in two examples there is a hair-like vertebral line, none possess the broad vertebral band of *mascareniensis*, the dorsum being usually chequered with black. The throat may be immaculate, or with faint infuscations, in both species.

Measurements. The largest ♂ (M. C. Z. 20398) measures 53 mm.; the larger ♀ (M. C. Z. 20403) only 48 mm.

Breeding. On May 24, at Peccatoni, males were assembled and calling, but numerous young were present, ranging in length from 15 mm., exclusive of caudal rudiments, to 28 mm.

On June 9, at Wema, both the 48 and 34 mm. females were distended with ova.

Dict. Stomachs examined, held: (1) Two grasshoppers, smooth-skinned caterpillar; (2) grasshopper; (3) two grasshoppers, two beetles; (4) two beetles, big ant; (5) similar species of ant 15 mm. long; (6) gravid sphingid moth; (7 and 8) empty.

RANA OXYRHYNCHUS OXYRHYNCHUS Smith

Rana oxyrhynchus A. Smith, 1849, Illus. Zoöl. S. Africa, Rept., pl. lxxvii, figs. 2, 2a-c: Kafirland and region of Port Natal.

- 10 (M.C.Z. 20301-5) Mt. Debasien, U. 18.xi.33.
- 5 (M.C.Z. 20376-9) Kirui's Village, K.C. 20.i.34.
- 2 (M.C.Z. 20396-7) Nairobi, K.C. 19.iii.34.
- 37 (M.C.Z. 20306-9) Kibwezi, K.C. 23.iii.34.
- 12 (M.C.Z. 20310-4) Tsavo, K.C. 1.iv.34.
- 15 (M.C.Z. 20315-6) Mt. Mbololo, K.C. 19.iv.34.
- 1 (M.C.Z. 20317) Lamu, Lamu Id., K.C. 8.v.34.
- 2 (M.C.Z. 20318-9) Peccatoni, K.C. 24.v.34.
- 4 (M.C.Z. 20320-3) Ngatana, K.C. 9.vi.34.
- 9 (M.C.Z. 20324-9) Malindi, K.C. 28.vi.34.
- 1 (M.C.Z. 20333) Sokoki Forest, K.C. (H.J.A.T.) vi.32.
- 2 (M.C.Z. 20330-1) Changamwe, K.C. 4.vii.34.
- 1 (M.C.Z. 20332) Opp. Kilindini Harbour, K.C. 4.vii.34.

Native names. *Kengele* (Kitaita); *chuachanco* (Kipokomo), but neither specific being applied to frogs, as distinct from toads, in general.

Variation. The tibio-tarsal articulation of the adpressed hind limb reaches far beyond the tip of the snout; fourth toe with $1\frac{1}{2}$ or 2 phalanges free of web, remaining toes webbed to the tips, or occasionally the third toe with one phalange free of web.

Measurements. The largest ♂ (M. C. Z. 20378) measures 42 mm. the largest ♀ (M. C. Z. 20324) 55 mm.

Breeding. Not breeding in November on Mount Debasien. On May 8 and 24, on Lamu and at Peccatoni respectively, males were assembling and calling in response to the first rains; in the former locality, in the absence of standing water, their enthusiasm had led them into a deep well.

Between March 23 and June 28, gravid females were taken at Kibwezi, Mbololo, Ngatana and Malindi. During the same period, however, young which ranged from 17 to 22 mm. in length, were encountered at Kibwezi, Tsavo and Malindi.

Diet. Stomachs examined, held: (1) Spider; (2) spider; (3) lycosid spider, cockroach, grasshopper, woodlouse; (4) grasshopper; (5) grasshopper; (6) grasshopper, acridian, beetle; (7) elater beetle; (8) two beetle larvæ; (9) large cricket; (10) caterpillar, frog hopper; (11) hemipteron and fulgorid homopteran.

Enemies. One was recovered from the stomach of a House Snake

(*Boodon lineatus*) on Lamu Island, another from that of a Spotted Wood Snake (*Philothamnus s. semivariegatus*) at Malindi.

Habitat. The Debasien series were taken at 5,000 feet. During the day they might be found as much as twenty feet from the river for which they would make if disturbed; the males leaping across the surface, doubtless possible by reason of their strongly webbed feet. At night they sat at the water's edge, or in the shallows, where they were easy to catch by shining a torch in their eyes.

RANA OXYRHYNCHUS GRIBINGUIENSIS Angel

Rana (Ptychadena) Gribinguiensis Angel, 1922, Bull. Mus. Hist. Nat. Paris, 28, p. 399, fig.: Fort Crampel, Gribingui, French Congo.

♀ (M.C.Z. 20334) Butandiga, U. 10.i.34.

♀ ♀ (M.C.Z. 20335-6) Kaimosi, K.C. 19.ii.34.

♀ (M.C.Z. 12706) Amani, T.T. 20.xi.26.

Distribution. This form is added to the fauna of all three British Territories for the first time. In East Africa I consider *gribinguiensis* to be the rain-forest representative of the widespread *oxyrhynchus*, to which Barbour and I (1928, p. 194) indeed referred the Amani, Usambara Mountains, specimen relisted above, considering it to be an example of gigantism resulting from the favourable climatic conditions prevailing at Amani.

Affinities. I believe that I am justified in according subspecific rank to *gribinguiensis* for we already have *Rana f. angolensis* of the lowlands and uplands represented by the larger, better webbed *R. f. chapini* in the rain forests, again *R. m. mascareniensis* of the lowlands and uplands represented by the larger *R. m. venusta* in the rain forests.

Moreover the only characters which I can find to separate *gribinguiensis* are: (1) Greater size, the five known females measuring 59 (type), 63, 63, 63 and 67 mm. respectively as against 55 mm. for an exceptionally large female of *oxyrhynchus*, females of the latter rarely exceeding 50 mm. (2) In *gribinguiensis* only 1-1½ phalanges of the fourth toe are free of web, the remaining toes are fully webbed. In *oxyrhynchus* 1½-2 (usually 2) phalanges of the fourth toe are free of web, the remaining toes are usually fully webbed or a phalange of the third may be free.

Neither the diameter of the tibia into its length, nor the length of the tibia into that of the head and body serve to distinguish *gribinguiensis* either from South or East African *oxyrhynchus*. The former may

prove to be a slender average character as the diameter is included 3.6 to 4.0 times in the length as against 3.5 to 3.8 in *oxyrhynchus*, the tibia is included 1.2 to 1.3 times in the length from snout to vent in the four females listed above, as against 1.3 to 1.5 times for an equal number of females from Southern Rhodesia.

Measurements. The largest known ♀ (M. C. Z. 20335) measures 67 mm.

Diet. Stomachs examined, held: (1) Hymenopteran of large size; (2) two hemiptera; (3) beetle and cockchafer.

Parasites. Larval nematodes (*Physaloptera sp.*) were present in a Kaimosi frog.

Enemies. One of the Kaimosi specimens was recovered from the stomach of a green snake (*Chlorophis hoplogaster*).

RANA MASCARENIENSIS MASCARENIENSIS Duméril & Bibron

Rana mascareniensis Dumeril & Bibron, 1841, Erpét. Gén., 8, p. 350: Madagascar; Mauritius; Seychelles.

- 1 (M.C.Z. 20337) Kikuyu, K.C. 14.iii.34.
- 2 (M.C.Z. 20338-9) Nairobi, K.C. 19.iii.34.
- 21 (M.C.Z. 20340-9) Kibwezi, K.C. 23.iii.34.
- 5 (M.C.Z. 20350-4) Mkonumbi, K.C. 22.v.34.
- 24 (M.C.Z. 20355-9) Peccatoni, K.C. 24.v.34.
- 1 (M.C.Z. 20360) Kau, Tana R., K.C. 4.vi.34.
- 13 (M.C.Z. 20361-4) Laini, K.C. 6.vi.34.
- 14 (M.C.Z. 20365-9) Ngatana, K.C. 9.vi.34.
- 11 (M.C.Z. 20370-4) Golbanti, K.C. 22.vi.34.
- 1 (M.C.Z. 20375) Karawa, K.C. 26.vi.34.

Variation. The tibiotarsal articulation of the adpressed hind limb reaches the eye, nostril, or just beyond end of snout, the latter chiefly in halfgrown or young frogs, irrespective of sex, all three conditions may be found in the Kibwezi series; 2 phalanges of the fourth, and 1, rarely 1½ phalanges, of the remaining toes free of web.

Measurements. The largest ♂ (M. C. Z. 20359) measures 48 mm., the largest ♀ (M. C. Z. 20338) 59 mm.

Breeding. On May 24, at Peccatoni, it was noted that males were calling. Between March 19 and June 6 gravid females were taken at Nairobi, Kibwezi, Peccatoni and Laini. During the same period, however, young, which ranged from 17 to 19 mm. at Mkonumbi, 20 to 21 mm. at Peccatoni, 24 to 28 mm. at Laini, and 27 mm. at Nairobi, were encountered.

Diet. Stomachs examined, held: (1) a 15 mm. ant (*Megaponera*); (2) 25 mm. moth; (3) large smooth-skinned caterpillar; (4) cricket; (5) cricket, grasshopper, spider; (6) cockroach, grasshopper; (7) grasshopper; (8) grasshopper, fly, spider; (9) beetle, cockchafer, spider.

Parasites. Larval nematodes (*Physaloptera* sp.) were numerous in the stomachs of a Peccatoni and Ngatana frogs.

Enemies. One recovered from the stomach of a Cormorant (*Haliëtor a. africanus*) and on two occasions from White-lipped Snakes (*Crotaphopeltis h. hotamboeia*) at Wema, Ngatana. Twice from Night Adders (*Causus resimus*) and once from a young frog (*Rana edulis*) at Peccatoni.

RANA MASCARENIENSIS UZUNGWENSIS Loveridge

Rana mascareniensis uzungwensis Loveridge, 1932, Bull. Mus. Comp. Zoöl., **72**, p. 384: Dabaga, Uzungwe Mountains, Tanganyika Territory.

Synonymy. This race has recently been referred to the synonymy of *R. subpunctata* Bocage, by my friend, Mr. K. P. Schmidt (1936, p. 129), who makes *subpunctata* a subspecies of *mascareniensis*.

That Schmidt's material from Gauca and Chitau is correctly identified with *uzungwensis* is possible, but that the latter is identifiable with *subpunctata* I most heartily disagree. Before describing *uzungwensis* I went into this possibility and rejected it for several reasons.

R. m. uzungwensis was based on a series of thirteen breeding frogs, with immaculately white bellies, of which the largest ♂ measured 42 mm., the largest ♀ only 44 mm. Now the holotype ♂ of *subpunctata* measured 51 mm., which, if it was a *mascareniensis* at all—which I doubt—would place it in the giant *R. m. venusta* Werner group. However, unlike the forms of *mascareniensis*, its throat is marbled and its breast, abdomen and limbs are spotted. In fact its color description is much like that of *katangae* Witte as will be seen from the figures of that species (Witte, 1921, Revue Zoöl. Afr., **9**, pl. ii) to which it also approximates in size. Witte's types being ♂ ♂ 50–55.5 mm., ♀ ♀ 52.5–56 mm.

I also emphatically disagree with the disposition of *anchietae* Bocage and *porosissima* Steindachner by placing them in the synonymy of *subpunctata*. It is true that Boulenger, (1882, p. 53) referred all three to the synonymy of *mascareniensis*, but Bocage (1895, p. 160), though willing for the first two to remain there, emphasized the distinctness of *subpunctata*.

It may be recalled that *uzungwensis* differed from the typical form

in having 3 phalanges of the fourth toe free of web. In his description of *anchietae*, Bocage distinctly states that only the last two phalanges of the fourth toe are free, this places it in the synonymy of *R. m. mascareniensis* where he was content to leave it. Steindachner makes no precise statement regarding the webbing on the fourth toe of *porosissima*, but his figure of the foot shows only a single phalange free of web.

Angola is vast enough to harbour the three forms—*R. m. mascareniensis*, *R. m. uzungwensis* and *R. m. venusta*.

RANA MASCARENIENSIS VENUSTA Werner

Rana venusta Werner, 1907, Sitz. Akad. Wiss. Wien, **116**, part 1, pp. 1889 and 1892, pl. iv, fig. 11: Entebbe, Uganda; Mongalla and Lagos.

4 (M.C.Z. 20380-3) Butandiga, U. 17.i.34.

7 (M.C.Z. 20384-9) Kirui's Village, K.C. 20.i.34.

8 (M.C.Z. 20390-4) Kaimosi, K.C. 10.ii.34.

Variation. The tibiotarsal articulation of the adpressed hind limb reaches well beyond the end of the snout; 1-1½ phalanges of the first toe, 1 of the second, 1-2 of the third, 2-3 of the fourth, and 1 of the fifth toe free of web.

Measurements. The largest ♂ ♂ (M. C. Z. 20385, 20392) measure 52 mm., the largest ♀ ♀ (M. C. Z. 20382, 20392) measure 66 and 64 mm.

Breeding. Adult females in all three localities were gravid, with the exception of one from Kirui's Village which had apparently spawned already.

Diet. Stomachs examined, held: (1) a tree frog (*Hyperolius rossii*); (2) grasshopper, pentastomid bug; (3) pentastomid bug, cockroach, beetle; (4) two beetles, hairy caterpillar, spider.

Habitat. Though there is no forest at Kirui's Village today, there was within living memory, and within a mile of the swamp where I captured these specimens gallery forest connected up with the forest of Mount Elgon. The Kaimosi series were captured at night around the mill pond where they were assembling for breeding.

RANA ANSORGII Boulenger

Rana ansorgii Boulenger, 1905, Ann. Mag. Nat. Hist. (7), **16**, p. 107, pl. iv, fig. 1: Between Benguela and Bihé, Angola.

♀ (M.C.Z. 14628) Behungi Escarpment, U. 5.iv.27.

Corrigenda. I take this opportunity of amending the identification of this specimen collected by Dr. J. Bequaert and referred to *mas-careniensis* by Barbour & Loveridge (1930, p. 792). It constitutes the first record of the occurrence of this species in Uganda, though already taken in Tanganyika Territory (*vide* Loveridge, 1933, p. 371).

ARTHROLEPTIDES DUTOITI Loveridge

Arthroleptides dutoiti Loveridge, 1935, Bull. Mus. Comp. Zoöl., **79**, p. 17: Koitobos River, Mount Elgon, Kenya Colony.

Parasites. The type of this remarkable addition to the Kenya Fauna discovered by Mr. C. A. du Toit of Stellenbosch, held a female oxyuroid which Dr. J. H. Sandground considers is probably referable to the genus *Aplectana*.

ARTHROLEPTIS STENODACTYLUS LÖNNBERGI Nieden

Arthroleptis lönnbergi Nieden, 1915, Mitt. Zoöl. Mus. Berlin, **7**, p. 361: Mombo, foot of Usambara Mountains, Tanganyika Territory.

Arthroleptis stenodactylus uluguruensis Loveridge, 1932, Proc. Biol. Soc. Washington, **45**, p. 61: Nyingwa, 7,000 to 8,000 feet, Uluguru Mountains, Tanganyika Territory.

Synonymy. The Museum of Comparative Zoölogy having recently received by exchange from the Royal Swedish Museum one of the topotype series on which Nieden based his *lönnbergi*, I have compared it with the type of *A. s. uluguruensis* and find them conspecific. It may be recalled that this was suspected at the time *uluguruensis* was described, but in view of the fact that I was informed at the time that a cotype of the latter from Nyingwa was quite distinct from the type of *lönnbergi*, which was said to be identical with the type of *stenodactylus*, I accepted that opinion and synonymized *lönnbergi* with the typical form. This action has now to be reversed.

ARTHROLEPTIS ADOLFI-FRIEDERICI Nieden

Arthroleptis adolfi-friederici Nieden, 1910, Sitz. Ges. naturf. Freunde Berlin, p. 440: Rugege Forest, Belgian Ruanda-Urundi.

♂ (M.C.Z. 20405) Mt. Mbololo, K.C. 21.iv.34.

Distribution. Taken in the forest at 4,500 feet, this solitary specimen constitutes the first record of the occurrence of the species in Kenya Colony. The find, however, is in conformity with other records

of common Usambara Mountain species inhabiting these Taita Mountains.

ARTHROLEPTIS MINUTUS Boulenger

Arthroleptis minutus Boulenger, 1895, Proc. Zool. Soc. London, p. 539, pl. xxx, fig. 4: Duro, southwestern Ethiopia.

Arthroleptis scheffleri Nieden, 1910, Sitz. Ges. naturf. Freunde Berlin, p. 438:

Nairobi and Kibwezi, Kenya Colony, etc.

78 (M.C.Z. 20406-11) Mt. Debasien, U. 14.xi.33.

130 (M.C.Z. 20430-9) Kaimosi, K.C. ii.34.

3 (M.C.Z. 20412-4) Kikuyu, K.C. 14.iii.34.

12 (M.C.Z. 20415-9) Kibwezi, K.C. 23.iii.34.

20 (M.C.Z. 20420-4) Mt. Mbololo, K.C. 17 & 19.iv.34.

6 (M.C.Z. 20425-9) Peccatoni, K.C. 24.v.34.

Distribution. Also taken at Eldoret by Mr. C. A. du Toit.

Native name. *Lungalla* (Luragoli and Lutereki, for they believe these little frogs to be the young of a *Rana*).

Variation. The Debasien locality is only some three hundred miles southwest of the type locality of *minutus*, the holotype of which measured 16 mm.; the Kibwezi series are topotypes of *scheffleri* of which the largest of 169 cotypes measured 20 mm.

There are certainly two size groups in the material listed above, those from the first three localities have adult males of 14-15 mm. and females of 17 mm. Kikuyu, however, is only a few miles from Nairobi which is one of the type localities of *scheffleri* and in color and markings these Kikuyu frogs appear indistinguishable from the Kibwezi material. The Kibwezi-Mbololo frogs have males measuring 18-19 mm. and females of 20-22 mm.

I have carefully measured up our *minutus* material from twenty-five localities in Uganda, Kenya and Tanganyika and it appears possible that the name *minutus* might be restricted to the smaller frogs in the northwestern part of the range (Duro, Gondokoro, Debasien, Entebbe, Kisumu, Kaimosi and Eldoret) while *scheffleri* could be applied in a subspecific sense to the frogs in the east and southwest. It seems advisable to await more material as there may be more overlapping than is shown by our series.

It might be as well to state that the small northwestern frogs, though agreeing in size with the *parvulus* material reported on (Loveridge, 1933, p. 386), have not the dark throat of the males nor so spotted an undersurface as the frogs from the southwestern highlands of Tanganyika.

I am not entirely satisfied that the Peccatoni frogs are racially identical with the larger Kibwezi-Mbololo specimens. The Peccatoni frogs have well-defined digital disks on some toes though absent on others. I was struck in the field by their general pallor, pale brown barring and white throats. The latter appears to be but an adaptation to their sandy habitat as is the case with *albifer* Ahl from Usaramo, also in the coastal belt. Our topotypic series of *albifer*, which is considered a synonym of *minutus*, show no tendency towards digital disks, however.

Coloration in life. Noted of the Kaimosi series, that the males, though all smaller than the material referred to *minutus* in 1933, appear to have dark throats as if adult. In alcohol these are now only dusky.

On Mount Mbololo, eleven males, of which one was embracing a female, had buff throats which were sometimes suffused with pink. That of the solitary female was only slightly buffy.

Measurements. The largest and smallest specimens west to east.

| | | | | |
|-----------------------|----------|-----------|----------------|--------|
| Mt. Debasien, largest | ♂ 14 mm. | ♀ 17 mm., | smallest young | 10 mm. |
| Kaimosi, | ♂ 14 mm. | ♀ 17 mm., | " " | 10 mm. |
| Kikuyu, | ♂ 15 mm. | ♀ 17 mm., | " " | 14 mm. |
| Kibwezi, | ♂ 19 mm. | ♀ 22 mm., | " " | 11 mm. |
| Mt. Mbololo, | ♂ 18 mm. | ♀ 20 mm., | " " | 15 mm. |
| Peccatoni, | ♂ 16 mm. | ♀ 18 mm., | " " | 14 mm. |

Breeding. While the largest females were gravid with spawn in all localities I do not think that they were ready for breeding at Debasien or Kaimosi. On March 19, on Mount Mbololo, ten males were calling, hopefully optimistic of the breaking of the rains; one male was embracing a female. The Peccatoni frogs had undoubtedly assembled for breeding.

Enemies. One of these frogs was recovered from the stomach of an Olive Water Snake (*Natrix o. olivacea*) at Kaimosi.

Habitat. On Mount Debasien, from 5,000 to 7,000 feet, abundant among fallen leaves on sandbars in the drying water courses where shaded by trees.

On Mount Mbololo, from 3,000 to 4,800 feet, on sandbars at edge of a stream at lower altitude, beneath a log at edge of forest at higher level.

On damp mud at the north end of Lake Peccatoni, northeast of Witu.

PHRYNOBATRACHUS KENIENSIS Barbour & Loveridge

Phrynobatrachus keniensis Barbour & Loveridge, 1928, Proc. New Eng. Zool. Club, 10, p. 89: Mount Kenya, Kenya Colony.

3 (M.C.Z. 20474-6) Molo, K.C. 12.iii.34.

2 (M.C.Z. 20477-8) Kikuyu, K.C. 14.iii.34.

Distribution. Since this very *Arthroleptis*-like species was described, the Museum of Comparative Zoölogy has received the undermentioned material:

7 (M.C.Z. 16114) Mt. Kinangop, K.C. (H.J.A.T.) 1930-1.

1 (M.C.Z. 19870) Kikuyu, K.C. (C.A. du Toit) 3.ii.34.

3 (M.C.Z. 19871-3) Uplands, K.C. (C.A. du T.) 1.ii.34.

The following remarks are based on all sixteen specimens listed.

Affinities. As the apparently closely related *Cacosternum b. boettgeri* occurs with *keniensis* on the Kinangop Plateau, it might be noted that an easy way of separating them at sight is to be found in the immaculate chin and throat of *boettgeri*. In *keniensis* the chin, and usually most of the throat, is flecked or speckled with reddish brown like the belly.

Coloration. One female (M.C.Z. 16114) exhibits a very broad, light, vertebral band such as one sometimes sees in *P. acridoides*. All the others are more or less uniformly dark, none exhibits a hairlike vertebral line.

Measurements. The largest ♂ (M.C.Z. 20474) measures 21 mm., the largest ♀ (M.C.Z. 19870) 25 mm., thus a millimetre larger than the type.

Breeding. On March 12 and 14, at Molo and Kikuyu respectively, females were swollen with spawn while the single male was distinguishable by the swollen base of the first digit.

Diet. Stomachs examined by Mr. Nathan Banks, held: (1) two simuliid diptera, three acalypterid diptera; (2) two acalypterid diptera, a fulgorid homopteran, beetle; (3) acalypterid dipteron, dipterous larvae, beetle, formicid ant, a winged and two wingless ants; (4) two fulgorid homoptera, capsid hemipteron, three springtails (*Collembola*); (5) weevil, beetle larva, uropodid mite (preserved).

Habitat. At Molo these frogs were heard calling an hour or two after sunrise but were located with great difficulty. They were secured eventually by parting the tufts of grass protruding from the water of a slow-flowing stream on the Londiani-Molo Road just below the Highland Hotel, a habitat which they shared with *Rana wittei*. At Kikuyu they were found in cattle-trampled marshland bordering a stream, an environment essentially similar to that at Molo.

PHRYNOBATRACHUS GRAUERI (Neiden)

Arthroleptis graueri Nieden, 1910, Sitz. Ges. naturf. Freunde Berlin, p. 441:
Rugege Forest, Belgian Ruanda-Urundi.

12 (M.C.Z. 20440-4) Sipi, U. 12.xii.33.

Tadpoles + 35 (M.C.Z. 20445-9) Butandiga, U. 8.i.34.

11 (M.C.Z. 20460-4) Kaimosi, K.C. 12.i.34.

Distribution. Also clearly seen at Buluganya; these three records of this rain-forest species on Mount Elgon constitute the first for its occurrence in Uganda. I (1929, p. 106) had already noted its presence at Kaimosi in western Kenya Colony.

Measurements. The largest ♂ (M.C.Z. 20440) measures 22 mm., the largest ♀ (M.C.Z. 20441) 28 mm., they are, however, equalled by frogs from Butandiga.

Breeding. Males were calling constantly both morning and evening, and on cloudy days, in a swamp close to our camp at Butandiga. Tadpoles and diminutive frogs, the smallest measuring 8 mm., were taken in this locality. On January 12, a male was heard calling from a small stream at Buluganya; he disappeared into the mud when stalked. The smallest frog in the Kaimosi series measures 11 mm.

PHRYNOBATRACHUS KINANGOPENSIS Angel

Phrynobatrachus kinangopensis Angel, 1924, Bull. Mus. Hist. Nat. Paris, 30, p. 130: Mount Kinangop, Aberdare Mountains, Kenya Colony.

2 (M.C.Z. 20455-6) Mt. Kinangop, K.C. (H.J.A.T.) 1931.

12 (M.C.Z. 20457-61) Kikuyu, K.C. 14.iii.34.

1 (M.C.Z. 20462) Nairobi, K.C. 19.iii.34.

Distribution. We are indebted to the generosity of Mr. H. J. Allen Turner for the topotypes. We have also recently received this species (M.C.Z. 19868) from Lari Forest Station, Uplands, K.C., through the kindness of Mr. C. A. du Toit.

Variation. Secondary sexual characters of the four breeding males from Kikuyu consist of a strongly swollen base for the first digit as in *Rana*, and nuptial asperities on the dorsum, thighs and tibiae in marked contrast to the smooth-skinned females.

Measurements. The largest ♂ (M.C.Z. 20457) measures 21 mm., the largest ♀ (M.C.Z. 20458) 24 mm.

Breeding. On March 14 and 19, at Kikuyu and Nairobi, males were assembled for breeding while the females were greatly distended with ova.

Diet. Stomachs examined, held several species of small beetles and a number of what were apparently homopterous nymphs.

PHRYNOBATRACHUS ACRIDOIDES (Cope)

Staurois acridoides Cope, 1867, Journ. Acad. Nat. Sci. Philad., 6, p. 198: Zanzibar.

- ♀ (M.C.Z. 20463) Kaimosi, K.C. ii.34.
4 (M.C.Z. 20464) Tsavo, K.C. 6.iv.34.
2 (M.C.Z. 20472-3) Peccatoni, K.C. 24.v.34.
♂ (M.C.Z. 20465) Witu, K.C. 30.v.34.
4 (M.C.Z. 20466-9) Kau, K.C. 4.vi.34.
♂ (M.C.Z. 20470) Ngatana, K.C. 9.vi.34.
♀ (M.C.Z. 20471) Golbanti, K.C. 22.vi.34.

Distribution. Also collected in Sokoki Forest by Mr. H. J. A. Turner.

Correction. I have just reexamined the material (M.C.Z. 16864-7 and 16869-85) from six localities in Tanganyika Territory which I (1933, p. 374) referred to *acridoides*. They all lack digital disks and are now considered to be the young of *natalensis*. I therefore retract my view that digital disks in *acridoides* are largely a breeding season character. The rest of the material have disks and were correctly referred to *acridoides*.

Affinities. One might have expected the Kaimosi frog to be referable to *perpalmatus*, the Central African representative of *acridoides*, but this does not appear to be the case. Peracca has recorded *acridoides* from Toro, Uganda and Sternfeld from Lake Chad and Parker from Cameroon.

Variation. Secondary sexual characters of the five males consist in the granular nature of the baggy skin on the throat.

Measurements. The largest ♂ ♂ ♂ (M.C.Z. 20470, 20472-3) measure 23 mm., the largest ♀ (M.C.Z. 20471) 28 mm.

Breeding. In February at Kaimosi, April 6 at Tsavo, June 4 at Kau, and June 22 at Golbanti, females were distended with ova and in the last locality males were heard calling.

In addition, it might be noted that three young, ranging from 6 to 8 mm., in length, were captured at Tsavo. As no rain had fallen in this locality for about a year (according to local natives), these frogs were taken in a water furrow which was supplying the gardens from the tanks at the station.

Diet. Stomach of the Golbanti frog held a beetle, four larvae of a tineid moth type, and four undigested skins of a larger species of caterpillar.

PHRYNOBATRACHUS NATALENSIS (Smith)

Stenorhynchus natalensis Smith, 1849, Illus. Zoöl. S. Africa, Rept., Appendix, p. 24: Port Natal.

38 (M.C.Z. 20479-85) Mt. Debasien, U. 14.xi.33.

1 (M.C.Z. 20486) Butandiga, U. 10.i.34.

3 (M.C.Z. 20487-9) Nairobi, K.C. 19.iii.34.

46 (M.C.Z. 20490-9) Kibwezi, K.C. 23.iii.34.

1 (M.C.Z. 20500) Tsavo, K.C. 5.iv.34.

Variation. De Witte (1919, p. 221), the last reviser of this genus, revived *ranoides* Boulenger of Pietermaritzburg, Natal, with which he synonymized *P. n. var. gracilis* Andersson of the Sudan on the basis of limb length. The Kibwezi series listed above, being comprised of adults and young of all ages, reveals that the tibia which is included $1\frac{3}{4}$ to 2 times in the length from snout to vent, is a juvenile character, while those of the adults are included 2 to $2\frac{1}{4}$ times; none of this Kibwezi series reach $2\frac{1}{2}$ times.

Measurements. The largest ♂ ♂ (M.C.Z. 20487, 20490) measure 32 mm., the largest ♀ (M.C.Z. 20491) 38 mm., both sexes surpassing my previous records.

Breeding. On March 23, at Kibwezi, a dozen calling males were captured, as well as double that number of gravid females, of which several were taken in embrace. The Debasien and Tsavo specimens were all subadult, the largest measuring only about 26 mm.

Dict. Stomachs examined, held: (1) termites; (2-6) empty, the frogs having been taken early in the evening.

Habitat. On Mount Debasien between 5,000 and 7,000 feet as described under *Arthroleptis minutus*. The habits of the two species were very different when disturbed for the *Phrynobatrachus* immediately sprang into the water, then swam back to the edge where they would remain floating with their snouts out of the pool.

The Nairobi frogs were found resting on submerged grasses close to the edge of a small stream. At Kibwezi, on weeds in the muddy shallows of a very large pond a couple of miles northeast of the station, yet close to the line. The Tsavo frog in a water furrow with *P. acridoides*.

HEMISUS MARMORATUM MARMORATUM (Peters)

Enystoma marmoratum Peters, 1855, Arch. Naturg., 21, part 1, p. 58: Cabaçeira, Mozambique.

- 2 (M.C.Z. 20501-2) Voi, K.C. 7.iv.34.
Eggs + 48 (M.C.Z. 20503-9) Lamu Id., K.C. 8-12.v.34.
6 (M.C.Z. 20510-5) Ngatana, K.C. 17.vi.34.
2 (M.C.Z. 20516-7) Gongoni, K.C. 27.vi.34.
2 (M.C.Z. 20518-9) Malindi, K.C. 29.vi.34.
4 (M.C.Z. 20520-4) Changamwe, K.C. 4.vii.34.

Variation. The gigantic female from Voi mentioned below, falls into the *H. m. guineensis* section of my key (1933, p. 390), but is coloured like the typical form and is not referable to the large western race.

Measurements. Both sexes are within the measurements given in my report (1933, p. 388) except a ♀ (M.C.Z. 20501) measuring 37 mm., *i. e.* 4 mm. longer than any specimen previously taken.

Breeding. On May 8, thirty-nine males and six females were taken alive from a well on Lamu Island. Escape from the well was impossible and numbers were already drowned. They shared this predicament with *Bufo r. regularis* and *Rana o. oxyrhynchus*. On May 12, a male was found clasping a female which was ensconced in a hole in the sand beneath the stem of a fallen coconut palm; nearby, in a precisely similar situation, another female was found covering a mass of freshly-laid white eggs. The rains had only just commenced and it seemed probable that the area would be flooded in the course of a week or two. On July 4, at Changamwe, a limbed tadpole, and a small frog with only the rudiment of a tail, were taken.

Diet. Stomachs of three examined, held ants.

BREVICIPITIDAE

HOPLOPHRYNE ROGERSI Barbour & Loveridge

Hoplophryne rogersi Barbour & Loveridge, 1928, Mem. Mus. Comp. Zoöl., 50, p. 258, pl. ii, fig. 5: Mount Bomoli, Amani, Usambara Mountains, Tanganyika Territory.

3 ♂ 2 ♀ (M.C.Z. 21346-50) Amani, T.T. (R.E.M.) vi.35.

Sexual dimorphism. The female of this species was unknown until the capture of this material by Mr. R. E. Moreau. I take this opportunity, therefore, of stating that the two gravid females differ from the males in lacking nuptial excrescences. As might be expected, there is no dagger-like spine on the site of the first digit, which is represented by a tubercle-like swelling comparable to the subarticular

tubercles on the three normal digits. There are five digits on the hind foot, of these both the first and fifth lack digital expansions.

PHRYNOMERUS BIFASCIATUS (Smith)

Brachymerus bifasciatus A. Smith, 1849, Illus. Zoöl. S. Africa, Rept., pl. lxiii:
Country to the east and northeast of Cape Colony.

8 (M.C.Z. 20524-8) Peccatoni, K.C. 24.v.34.

11 (M.C.Z. 20529-33) Malindi, K.C. 29.vi.34.

3 (M.C.Z. 20534-6) Changamwe, K.C. 4.vii.34.

Affinities. It is somewhat difficult to decide as to whether this genus should be included in the Brevicipitidae or relegated to a separate family, the Phrynomeridae. Parker (1934, p. 3) has quite logically adopted the latter course on account of its possession of intercalary cartilages. De Villiers (1933, p. 275), and more recently Vos (1935, p. 261), however, stress the numerous characters common to Phrynomerus and true Brevicipitids which they think should offset the single difference. For the present I accept the conservative view and let it remain in the Brevicipitidae.

Sexual dimorphism. The dark throat, which I supposed was characteristic of males, is present on all Peccatoni specimens. On dissecting the largest, however, it was found to be a gravid female; two others examined were males.

Measurements. The largest ♂ (M.C.Z. 20524) measures 51 mm., the largest ♀ (M.C.Z. 20534) 55 mm.

Breeding. On May 24, at Peccatoni, and on July 4, at Changamwe, females were gravid. The Malindi frogs are all juvenile, ranging from 25 to 31 mm.; two of the Changamwe frogs are also young, measuring 22 and 27 mm. respectively.

Dict. Stomachs of three examined, held ants with powerful jaws.

Enemies. Two were recovered from the stomach of a night adder (*Causus resimus*) at Peccatoni.

Defence. These aposematic frogs have a slightly fishy smell which disappears shortly after death.

Habitat. On hearing the distinctive call of these frogs after a lapse of four years, it was immediately recognized, and I led my 'boys' half-a-mile across country to the swamped ground where they were assembling. Many of the Malindi series were taken from a hole beneath a log; the adult from Changamwe was under a pile of palm-leaf debris; the young were up in bananas though not far from the ground.

BIBLIOGRAPHY

AHL, ERNST

1931. "Anura III." in *Das Tierreich*, **55**, pp. i-xvi + 1-462, figs. 1-320.

BARBOUR, THOMAS and LOVERIDGE, ARTHUR

1928. "A Comparative Study of the Herpetological Fauna of the Uluguru and Usambara Mountains, Tanganyika Territory, with Descriptions of new Species." *Mem. Mus. Comp. Zoöl.*, **50**, pp. 87-265, pls. i-iv.
1930. "Reptiles and Amphibians from the Central African Lake Region." in Strong, "Report of the Harvard-African Expedition upon the African Republic of Liberia and the Belgian Congo." **2**, pp. 786-796.

BOULENGER, G. A.

1882. "Catalogue of the Batrachia Salientia s. Ecaudata in the Collection of the British Museum." Ed. 2. London, pp. i-xvi + 1-305, figs., pls. i-xxx.

DUNN, E. R.

1928. "Notes on Central American Caecilians." *Proc. New Eng. Zoöl. Club*, **10**, pp. 71-76, pl. v.

LÖNNBERG, EINAR

1907. "Reptilia and Batrachia." in Sjöstedt, "Wissenschaftliche Ergebnisse der Schwedischen Zoologischen Expedition nach dem Kilimandjaro, dem Meru und den Umgebenden Massasteppen 1905-1906." *Upsala*, pp. 1-28, pl. i.

LOVERIDGE, ARTHUR

1933. "Reports on the Scientific Results of an Expedition to the South-western Highlands of Tanganyika Territory. VII. Herpetology." *Bull. Mus. Comp. Zoöl.*, **74**, pp. 197-416, pls. i-iii.

NOBLE, G. K.

1924. "Contributions to the Herpetology of the Belgian Congo based on the Collection of the American Museum Congo Expedition, 1909-1915. Part III. Amphibia." *Bull. Am. Mus. Nat. Hist.*, **49**, pp. 147-347, figs. 1-8, pls. xxiii-xlii.

PARKER, H. W.

1931. "A Collection of Frogs from Portuguese East Africa." *Proc. Zoöl. Soc. London*, 1930, pp. 897-905, fig., pl. i.
1934. "A Monograph of the Frogs of the Family Microhylidae." London, pp. i-viii + 1-208, figs. 1-67.

SCHMIDT, K. P.

1936. "The Amphibians of the Pulitzer Angola Expedition." *Ann. Carnegie Museum*, **25**, pp. 127-133.

VILLIERS, C. G. S. de

1933. "Breviceps and Probreviceps: comparison of the cranial osteology of two closely related Anuran genera." *Anat. Ans.*, **75**, pp. 257-276, figs. 1-7.

VOS, C. M. DE

1935. "Spelaeophryne and the bearing of its Cranial Anatomy on the monophyletic origin of the Ethiopian and Malagasy Microhylids." *Anat. Anz.*, **80**, pp. 241-265, figs. 1-5.

WITTE, F. G. DE

1919. "Révision de Genre Phrynobatrachus Günth. et description d'une espèce nouvelle." *Revue Zoöl. Afr.*, **6**, pp. 220-228.

EXPLANATION OF PLATES

PLATE 1

Fig. 1. The Millpond at Kaimosi, Kakamega, Kenya Colony.

After the breaking of the 'big rains' on March 3, 1934, this pond became the rendezvous of thousands of frogs. It was by treading on the sedges in the foreground that the smooth-clawed frogs (*Xenopus laevis victorianus*) were induced to pop their heads out of the water.

Fig. 2. A pair of Square-marked Toads (*Bufo r. regularis*).

Those photographed were removed from a shallow pool, where numbers were in embrace, at Kaimosi, on February 10, 1934. A leech, which may be seen on the right, detached itself from the rump of the male and left behind a raw circular patch. Leeches were seen on other toads in this pool.



1



2



PLATE 2

PLATE 2

Fig. 1. Nests of Tree Frogs (*Chiromantis xerampelina*) at Witu.

When ovipositing, the female frog exudes a quantity of albumen, which, by energetic trampling of the hind feet, she works into a mass of foam resembling a meringue. Its exterior hardens after a few hours exposure to the atmosphere. The eggs within hatch in due course, the resulting tadpoles feed upon the albumen and receive their oxygen from the bubbles of imprisoned air. The central portion of the nest, containing the tadpoles, soon resolves into a fluid condition. When little but the outer crust remains, the 'nest' ruptures horizontally, precipitating the tadpoles into the pond beneath. There they continue to develop and metamorphize. Photograph by Mr. R. D. Milne, May 31, 1934, on the estate near Witu, K. C.

Fig. 2. Searching for tree frogs in Wild Bananas on Mount Elgon.

In Tanganyika, wild bananas are a favourite haunt of the Polypedatid frogs (*Leptopelis*, *Megalixalus*, and *Hyperolius*). To reach them it is necessary to strip the outer leaves from off the stem. Our efforts on Mount Elgon proved fruitless, while at Kaimosi only *Hyperolius picturatus* was found. The photograph was taken in a ravine near Sipi at an altitude of about 7,000 feet.



1



2



PLATE 3

PLATE 3

Fig. 1. Forest-dwelling Leaf Frogs (*Hyperolius rossii*) at Kaimosi.

In this locality, camp was pitched in a clearing in the rain forest. Twice on March 2, as I was working at a table outside my tent, leaves came rotating down to my feet from a great height. In the centre of each leaf, one of these beautiful little orange-spotted frogs was squatting. We removed them to a nearby shrub where they were photographed.

Fig. 2. A terrestrial, burrowing Polypedatid (*Kassina senegalensis*).

The distinctive bubbling notes of these handsomely spotted, pale bronze frogs, might be heard a mile from the millpond at Kaimosi, where they assembled on March 3, following the breaking of the rains a day or two before. Some months later, though at the coast, many young ones were found beneath logs and vegetable debris in a cotton plantation. Caterpillars, ants, and many species of flies were found to furnish them with food.



1



2

W 3-2
1937

Bulletin of the Museum of Comparative Zoölogy

AT HARVARD COLLEGE

VOL. LXXIX, No. 8

SCIENTIFIC RESULTS OF AN EXPEDITION
TO RAIN FOREST REGIONS IN EASTERN AFRICA

VIII
OLIGOCHAETA

BY DR. WILHELM MICHAELSEN

HAMBURG, GERMANY

The Library
Museum of Comparative Zool
Harvard University

CAMBRIDGE, MASS., U. S. A.

PRINTED FOR THE MUSEUM

OCTOBER, 1937

No. 8. — *Reports on the Scientific Results of an Expedition to Rain
Forest Regions in Eastern Africa*

VIII

Oligochaeta

BY WILHELM MICHAELSEN

INTRODUCTION

The following pages contain an account of the Oligochaeta obtained by Mr. Arthur Loveridge on his expedition to Uganda and Kenya Colony in the years 1933 and 1934. In addition there are a few worms collected by him in the Uluguru Mountains of Tanganyika Territory (Mandated German East Africa) during his journey of 1926–1927, which were not examined by my late colleague and friend, Mr. J. Stephenson, in his report (1933, pp. 225–247) on the material collected in 1929–1930.

My thanks are due to Dr. Thomas Barbour, Director of the Museum of Comparative Zoölogy, for entrusting me with the examination of this oligochaetal collection, valuable as are all such from Tropical Africa, a region so productive of interesting species of Oligochaeta. The main collection, containing the types of the new species, is in the Museum of Comparative Zoölogy, Cambridge, Massachusetts; some cotypes are deposited in the Zoölogical Museum at Hamburg.

Family ACANTHODRILIDAE

Subfamily OCTOCHAETINAE

Genus DICHOGASTER Beddard

DICHOGASTER BAGILOANA sp. nov.

One mature specimen, internally somewhat softened, from Bagilo (about 6°50' south lat., 37°50' east long.), 6,000 feet, Uluguru Mountains, Tanganyika Territory.

External Characters. Length 60 mm., diameter 4–4½ mm. Segments about 130.

Colour whitish, result of posthumous bleaching?

Body cylindrical.

Head? Prostomium drawn in, obviously very small; a longitudinal dorsal furrow, presumably coming from the prostomium, divides segment I.

Setae very slender, very strictly paired, all of them decidedly ventral in position.

First dorsal pore at the intersegmental furrow V/VI.

Clitellum annular, occupying segments XIII-XX (=8), being only feebly developed at segment XX which is as short as the normal segments following, whereas the proper clitellar segments are distinctly longer.

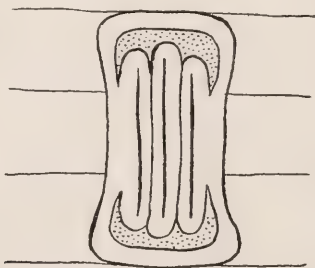


Fig. 1. *Dichogaster bagiloana*. Male sexual field.

Male sexual field (fig. 1) medio-ventral, between the intersegmental furrow XVI/XVII and XVII/XVIII, biscuit-shaped, bilaterally symmetrical, distinctly longer than its greatest breadth, broadest in segments XVII and XIX, narrowed in segment XVIII, curved laterally but with straight anterior and posterior borders. The bordering walls are moderately broad but progressively narrowing until reaching segment XVIII. The interior of the male field bears three pairs of lighter, nearly whitish, straight longitudinal walls, all rather close together, those of each pair uniting at the ends by a round connecting part. The median pair is slightly longer than either of the lateral ones, all of them extend far into segments XVII and XIX. Between the longitudinal walls of each pair is a sharp, straight, longitudinal furrow. I presume that the furrows of the lateral pairs are seminal furrows. The space between these walls and the outer wall bordering the male field in segments XVII and XIX is somewhat depressed, especially at the sides. Here it is somewhat broader, the lateral pairs of longitudinal walls being shorter than the median pair. I presume that the pores of the prostates—2 pairs at segments XVII and at XIX—are situated in the deepest depressions in the 4 corners of the male field,

but I could not recognise them, neither could I recognise a connection between these depressions and the supposed seminal furrows. Equally uncertain is the position of the male pores which are to be sought in the interior of the male field, presumably in the seminal furrows at segment XVIII.

Spermathecal pores indistinct, 2 pairs in the intersegmental furrows VII/VIII and VIII/IX in the lines of the median pairs of setae, in *ab*.

Internal Anatomy. Septa VI/VII-IX/X very thin but IX/X slightly thickened in the centre, while X/XI-XIII/XIV are moderately thickened.



Fig. 2. *Dichogaster bagiloana*. Prostata.

Alimentary canal. Two gizzards in segments V and VI. 3 pairs of almost equally large, whitish chylous pouches in segments XV, XVI and XVII, apparently entirely separated from one another, kidney-shaped with relatively smooth surfaces, but their somewhat broad, convex ridge is crossed by many densely-grouped, darker stripes which partly take the shape of furrows. The intestine bears a simple, large, ribbon-shaped, irregularly meandering typhlosolis.

Nephridia (mostly destroyed in the type) are very small, sac-shaped, and apparently very numerous (about 6 or more in each half of a segment?).

Anterior male organs holoandric. Two pairs of testicles apparently depend free into the body cavity of segments X and XI; apparently only one pair of seminal vesicles depend from septum 11/12 into segment XII. They are small, much broader than long, multipartite, with a short and narrow stalk.

Posterior male organs. Two pairs of nearly equally large prostates (fig. 2) in the body cavity of segments XVII and XIX. These segments are slightly expanded dorsally. Glandular part moderately long, above the intestine, touching or nearly touching that of the other side,

irregularly cylindrical, rather thick, especially at their ectal part (where they are as much as 1 mm. thick), irregularly meandering and bent, the folds of the undulations closely adpressed; glandular part smooth externally and without noticeable muscles, mainly composed of glandular cells, its axial lumen very narrow. I am not quite sure whether the lumen is provided with an epithelium, the cells of which are indistinct between the densely crowded fine ducts of the glandular cells discharging into the lumen. The duct of the prostate is sharply set off from the thick ectal end of the glandular part, rather short and uniformly very thin, (about 0.1 mm. thick in all its length, muscular with a distinct epithelium covering its narrow, axial channel. Each prostate is provided with a penial-seta-sac. Each sac contains a single penial seta which resembles in shape, though not in dimensions or ornamentation, that of the allied species *D. kigogoana* Stephenson (1933, p. 233, fig. 6). Stephenson's drawing of the whole seta might well pass for that of my new species if we do not consider the matter of size. A penial seta of *D. bagiloana* is about 2.3 mm. long and about 15μ thick in the middle of the shaft (for *D. kigogoana*, 1.34 mm. long and 15μ thick in the middle of the shaft), distinctly thickened at the ental end (here about 50μ thick). In general the seta is nearly straight, being only noticeably bent in its ental eighth, while its ectal end is bluntly tipped and slightly hooked. There are a few very faint undulations on the ectal half of the shaft (somewhat less distinct than in the figured seta of *D. kigogoana*, but in some penial setae of this species its author remarks that the undulations "may be almost indistinguishable"). I could recognise no ornamentation of the penial seta of *D. bagiloana* such as would appear to be characteristic of *D. kigogoana*; in the latter, however, the ornamentation is so scanty that its absence would not constitute an important systematic difference.

Spermathecae entirely similar to those of *D. kigogoana*. In fact, Stephenson's drawing (1933, p. 233, fig. 5) of a spermatheca could pass for one of *D. bagiloana*, but on a closer examination of the latter no thecocystis was found. Ampulla rather small, globular or stoutly pyriform, thin-walled, clearly distinct from the middle portion. The latter is greater than the ampulla, thicker and somewhat longer, globular, or nearly so, with slightly stouter walls which are smooth on the outer surface but with some longitudinal projections into the lumen. The muscular duct of the spermatheca is about as long as the middle portion, not sharply set off from it, conical, narrowing towards its ectal end, with narrow and smooth axial canal and thick muscular wall. Its ental end does not project noticeably into the lumen of the

middle portion. A single, rather large, sub-globular diverticulum, containing a sperm ball, depends downwards beside the ental half of the duct, discharging into the basal part of the middle portion of the spermatheca through a short, narrow stalk.

Remarks. *D. bagiloana* is so nearly allied to *D. kigogoana* Stephenson (1933, p. 232) from the Uzungwe Mountains, that I was at first uncertain whether or not to regard it as a subspecies of that worm. *D. kigogoana* is much smaller, about half as long and half as thick. The difference in the size of the body as well as in the size of certain organs cannot be considered as a juvenile character for the type specimen of the smaller worm is fully mature, and already sexually functional, the spermatheca containing sperm. The main differences are as follows: the clitellum is annular in the new species, saddle-shaped in Stephenson's worm. In my species the prostates have a rather large, very thick, meandering glandular part with a very narrow lumen, whilst in *D. kigogoana* they are said to be rather small, tubular, and not coiled. In *D. bagiloana* the penial setae are very much larger and show no trace of the ornamentation which characterizes the smaller examples of *D. kigogoana*. A remarkable difference may be found in the configuration of the male sexual field which is very complicated in *D. bagiloana*, whilst of *D. kigogoana* Stephenson mentions only that "the seminal grooves are straight, bordered by faint lips." The complex configuration of the male field in *D. bagiloana* resembles the rather more complicated figure of the male field in *D. ficta* Michaelson (1934, p. 26, fig. 14) from the Belgian Congo. The male field of this species also exhibits some longitudinal furrows, one of which lies in the median-ventral line; in other respects, however, the species from the Belgian Congo is very different from *D. bagiloana*.

DICHOGASTER ELGONENSIS sp. nov.

Three somewhat softened specimens, from Kaburomi (about 1°15' north lat., 34°30' east long.), 10,500 feet, western slope of Mount Elgon, Uganda.
28.xii.33.

External Characters. Length about 90 mm., diameter 2-3 mm. segments about 140.

Colour dark, dirty gray (possibly not the original colour).

Head pro-epilobous, with a minute, roundish dorsal appendage invading segment I.

Setae slender, strictly paired, decidedly ventral in position, the

median-dorsal distance equalling about three-quarters of the circumference of the body, the median-ventral distance is slightly greater than the middle lateral ($aa \approx bc$, $dd = \frac{3}{4}\mu$, approximately).

Clitellum occupying segments XIII- $\frac{1}{2}$ XXI ($= 8\frac{1}{2}$), inclined against the intersegmental furrow XII/XIII as well as against the middle zone of segment XXI, annular only at segment XIV, interrupted ventrally in the rest, the interruption being broader at segments XIII and XXI.

Male sexual field (fig. 3) bilaterally symmetrical. Two pairs of prostate pores at segments XVII and XIX in the line of a pair of ventral setae, *ab*, those of either side united by a nearly straight,

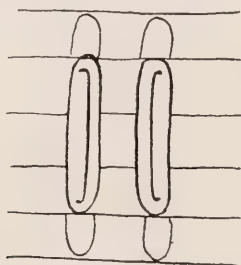


Fig. 3. *Dichogaster elgonensis*. Male sexual field.

longitudinal seminal furrow which is slightly bent at the extremities, convex against the median line. Each seminal furrow is closely flanked by a pair of rather narrow walls which unite after bending round the prostate pores. The terminal ends of such a pair of walls are continued forwards and backwards upon the neighbouring segment (XVI and XX) into a somewhat less prominent, not sharply bordered glandular field.

Spermathecal pores indistinct, 2 pairs in the intersegmental furrow VII/VIII and VIII/IX in the line of the ventral pairs of setae *ab*.

Internal Anatomy. Septa IX/X-XIII/XIV thickened, XI/XII and XII/XIII strongly, X/XI and XIII/XIV moderately, IX/X slightly, the remaining septa very thin.

Alimentary canal. Two large gizzards in segments V and VI; 3 pairs of chylous pouches, broadly ridged in segments XV, XVI and XVII, relatively long, bean-shaped, somewhat irregularly incised at the convex borders, occupying the entire flanks of the oesophagus within the range of those three segments, those of a pair nearly meeting each other in the median-dorsal and median-ventral line of the oesophagus.

Only the chylous pouches of the first pair in segment XV discharge separately by means of an individual, short and narrow, tubular stalk. The stalks of the posterior pouches in segment XVII are bent forwards into segment XVI, and unite with the stalks of the middle pair. The intestine bears a simple, smooth, ridge-like typhlosolis.



Fig. 4. *Dichogaster elgonensis*. Ectal part of a penial seta. x 140.

Michronephridia in the antecitellian part of the body small and numerous, in the postcitellian portion more or less large, flattened, sac-shaped, rather constantly 4 in each half of a segment.

Anterior male organs holoandric. Two pairs of testicles ventrally in the anterior parts of segments X and XI, enclosed in the narrow basal parts of thin-walled, pyriform, testis sacs which extend as far as the dorsal part of their segment and are crowded with masses of

developing sperm. I failed to recognise seminal vesicles but would hesitate to assert that such organs were absent.

Posterior male organs. Two pairs of equally large prostates in segments XVII and XIX. Glandular part cylindrical, about 0.25 mm. thick, very long, irregularly coiled, with smooth, yellowish-white surface; duct tubular, uniformly thick (about 0.1 mm.) throughout its length, moderately long, sharply set off from the glandular part, discharging in a simple manner through the prostatic pore. Penial setae (fig. 4) uniform, about 1.9 mm. long, at the ental end 45μ , in the centre 25μ and just before the ectal end 12μ thick, very slightly and simply bent; the ectal half with the exception of the terminal part shows a slight undulation causing only about five moderately prominent waves at the profile-lines of the seta; in height these waves are equal to about a quarter of the width of the seta. The ectal tip of the penial seta is simple and moderately sharply pointed; ornamentation of this seta is restricted to its ectal half, differing in appearance in various parts of the seta, commencing with a small tract beneath the ectal tip of a relatively large, triangular thorn, rising out of the ental part of a not very distinct scar, and bent off from the seta so as to project considerably above the profile line of the seta. The subsequent ornamentation is somewhat distant from the first mentioned as well as from one another and is somewhat irregularly arranged. Proceeding entalwards, the ornaments alter in appearance successively, the thorns become smaller, shorter and finally quite indistinct; meanwhile the scar, from which the thorn rises, becomes more distinct, longer and deeper in its now sharply bordered ental end; these scars devoid of thorns, or at least without noticeable thorns, are situated at the ectal slope of the above-mentioned undulations of the seta.

Spermathecae (fig. 5) two pairs of equal size. Ampulla rather small, inverted pyriform, much shorter than the duct and middle part together; middle part sharply set off from the ampulla, about half as thick (fig. 5a), if not somewhat swollen (fig. 5b), about as long as the muscular duct, from which it is not at all, or at least not sharply set off. A single pyriform diverticulum arises beside the middle part and the ectal half of the ampulla. The swollen ental half of the diverticulum is directed upwards, parallel to the main part of the spermatheca against which it is inclined. It contains a single oval sperm compartment filled with spermatozoa. The ectal half of the diverticulum is a narrow tubular stalk of which the basal part is bent upwards and discharges rather high up in the middle portion of the spermatheca not very far from the entrance into the ampulla. This relation of the

diverticulum to the other parts of the spermatheca cannot be seen directly, as the basal part of the diverticulum is covered by a tissue which slopes equally upwards against the sperm compartment of the

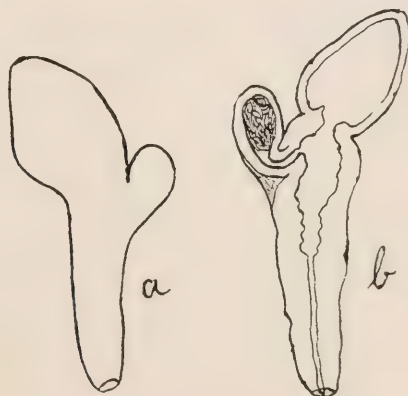


Fig. 5. *Dichogaster elgonensis*. Spermathecae of two different specimens: *a* with contracted middle portion, *b* with swollen middle portion, the first only in outline, the latter made transparent.

diverticulum and downwards against the muscular duct of the spermatheca; these organs and their relative positions can only be recognised properly in cleared preparations (fig. 5*b*) and in slides of longitudinal sections.

DICHOGASTER KABUROMINA sp. nov.

Several well-preserved adult and immature specimens, from Kaburomi (about 1°15' north lat., 34°30' east long.), 10,500 feet, western slope of Mount Elgon, Uganda. 28.xii.33.

External Characters. Length about 90 mm., diameter $4\frac{1}{2}$ –5 mm., segments about 155.

Colour light yellowish red, a little more intensive at the clitellum, with dusky mottling at the middle and hinder part of the body, the light nephridia and the dark contents of the intestine showing through the semi-transparent body wall.

Body cylindrical only in its anterior part, slightly depressed behind the clitellum.

Head epilobous (about $\frac{1}{2}$), lateral borders of the dorsal appendage converging posteriorly, uniting here so as to form a narrowly rounded hinder end of the appendage. Segments of the anterior portion of the body triannulate.

Setae very slender, strictly paired, median-dorsal distance occupying about two-thirds of the circumference of the body ($aa=bc$; $dd=\frac{2}{3}u$, approximately), median-ventral distance a little greater than the middle lateral distances.

Dorsal pores only distinguishable behind the clitellum.

Clitellum annular, occupying segments XIV–XX (=7), occasionally, though not in all specimens, less developed ventrally.

Male sexual field bilaterally symmetrical, biscuit-shaped, a little longer than its maximum breadth median-ventrally at segments XVII–XIX, laterally extending a little over the lines of setae *b*; its contour, broadest at segments XVII and XIX, smallest at segment XVIII; it is marked laterally, though sometimes indistinctly, by a rather flat and broad wall. The 2 pairs of prostate pores occupy the 4 corners of the male field at segments XVII and XIX in the line of the innermost pairs of setae, *ab*. The seminal furrows connecting the two pores of each side, and close to the median side of the lateral walls, are deeply curved in a medial direction in the range of segment XVIII, being adapted to the curvature of the lateral walls. I failed to distinguish the male pores.

Spermathecal pores, 2 pairs at the intersegmental furrows VII/VIII and VIII/IX in the line of the setae *ab*.

Internal Anatomy. Septa V/VI–IX/X very thin, X/XI–XIII/XIV somewhat thickened, XIV/XV slightly thickened, those following very thin.

Alimentary canal. Two large gizzards in segments V and VI. 3 pairs of chylous pouches in segments XV, XVI and XVII, are rather large, approximately equal, longish bean-shaped, occupying the whole length of the oesophagus in these three segments. The intestine bears a simple, irregularly zigzag, ridge-like typhlosol.

Micronephridia in the anticitellian segments small, irregularly scattered rather large in the postclitellian segments, sac-shaped, mostly with a rounded-quadrangular contour; usually 5 or 6, rarely 7, micronephridia in each half of a segment, 7 only when the lowest nephridium is replaced by two smaller ones.

Anterior male organs holoandric. Testicles indistinguishable; 2 pairs of testis sacs in segments X and XI, these large pear-shaped sacs extending far into the dorsal region of their segment, the broad, lower

parts of each pair united ventrally, containing a pair of large male funnels in the posterior part, and presumably the testicles in the anterior part. The two male funnels of one segment are not distinctly separated from one another; 2 pairs of moderately large seminal vesicles depend from the septa X/XI and XI/XII into segments XI and XII, those of the anterior pair in segment XI enclosed in the testis sacs of the anterior pair, those of the posterior pair free in the body cavity of segment XII; these seminal vesicles are broader than long, grape-shaped, the somewhat small berries being closely crowded.

Posterior male organs. Two pairs of prostates in segments XVII and XIX, laterally attached to the intestine; glandular part yellowish, very long, tubular, about 0.5 mm. in diameter, more or less broadly convoluted, the adjacent bends pressed against each other; duct very much shorter but relatively long, very thin throughout its length, about 0.1 mm. in diameter; each prostate accompanied by a penial-seta-sac, each of which contains some penial setae, one that was closely examined held 5. The setae of one penial sac are of very different size and shape. At first I believed that this was a case of dimorphism such as is known in some species of this genus, a careful examination, however, convinced me that the difference depends upon the stages of development. In many mature specimens of *D. kaburomina* penial setae were protruded but only one at each prostate pore and always that one of the largest size, not 2 dimorphic ones, such as may be found protruding side by side in species with true dimorphic setae. A fully grown penial seta of *D. kaburomina* (fig. 6a) is about 1.6 mm. long, in the middle about 60 μ thick, broadened at the ental end to about 85 μ , and gradually diminishing towards the ectal end to a diameter of about 36 μ a short distance beneath the ectal end, nearly straight in the middle, moderately and equally curved in the ectal fourth, slightly curved in the same direction at the extreme ectal end. The ectal end is moderately sharply and simply pointed. The ectal half of this seta shows a characteristic ornamentation consisting of some short, triangular teeth which are broad at their bases. These teeth occupy the ental end of small scars, and project distinctly above the profile lines of the seta; they are arranged irregularly and well separated from each other; in number there may be as many as 10 or 12; towards the middle of the seta they become very small and indistinct. Besides this external ornamentation the setae show a certain interior structure consisting of a very delicate and dense annulation which in no way alters the smoothness of the surface of the profile lines of the setae (fig. 6b). One of the smaller setae of the same

seta-sac (fig. 6c), the only one which I could examine in an uninjured state, is 0.95 mm. long and in the middle $35\ \mu$ thick, straight in nearly all its length, only slightly bent at its ectal tip. It is quite smooth without any ornamentation but internally exhibiting the same annulation.

Female organs. A pair of very large ovaries depend from the ventral margin of septum XII/XIII into segment XIII.

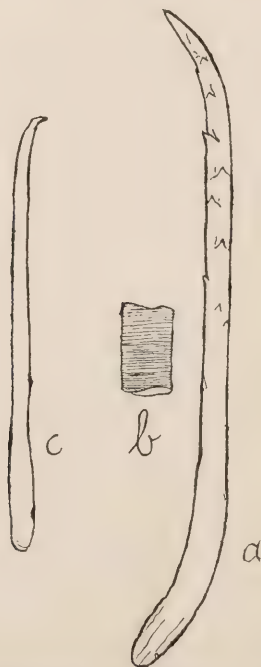


Fig. 6. *Dichogaster kaburomina*. Penial setae. a a fully developed one, $\times 60$, b middle part of the same, $\times 120$, c an unfinished one of the same bundle, $\times 60$.

Spermathecae (fig. 7). Ampulla rather small, pear-shaped or nearly cylindrical, with a thin smooth wall, ampulla connected with the middle portion of the spermatheca by a short and very narrow neck, it always seems to be bent aside; median portion is longer than the ampulla and either distinctly thicker than the latter, just as thick, or even a little thinner, according to whether it holds a thecacystis or not; wall of the middle portion moderately thick, mainly smooth, but at its ental part near the ampulla it is provided with some ring-shaped

edges narrowing the lumen; the muscles of this middle portion are not noticeable; the muscular duct of the spermatheca is somewhat shorter than the middle portion and somewhat, if not much, thinner, moderately sharply set off from it with narrow, smooth, axial canal. A diverticulum, about half as long as the middle portion, discharges into the ectal part of the middle portion against which it is inclined. I have examined the diverticula of two specimens, only two of these eight diverticula (one from each specimen) are simple pear-shaped with a



Fig. 7. *Dichogaster kaburomina*. Spermatheca made transparent.

short narrow duct and containing a simple sperm ball; in five of the other diverticula the broad blind end was more or less deeply cleft, the contour of the diverticulum became heart-shaped. The sperm space also is paired, the two parts of it being separated from each other over a more or less lengthy tract, frequently for nearly their entire length. In one of the diverticula examined there is a third sperm space in addition to the two already mentioned. This, however, is not placed in the plane of the others but is situated somewhat lower and nearer to the common stalk of the diverticulum; in the 4 spermatheca of one specimen which had a narrow middle portion, the latter were empty, in the spermathecae of another worm with a broader middle portion, the latter held a thecacystis with a large, oval, almost globular head and a short, narrow tail extending into the ectal part of the narrow axial canal of the muscular duct.

Subfamily OCNERODRILINAE

Genus GORDIODRILUS

GORDIODRILUS WEMANUS sp. nov.

Many well-preserved adults and young, from Wema (about 2°30' south lat., 40° east long.), Ngatana district, Tana River, Kenya Colony.

External Characters. Length 35–45 mm., diameter 1.0–1.2 mm., segments about 120.

Colour uniformly brown, scarcely darker above than below.

Body cylindrical with rather smooth surface; intersegmental furrows in general rather indistinct, but somewhat better defined on the anterior portion of the body.



Fig. 8. *Gordiodrilus wemanus*. Dorsal view of the head.

Head (fig. 8) epilobous (about $\frac{1}{2}$). Prostomium broad and rather short, uniformly rounded; dorsal appendage of the prostomium broad, narrowing posteriorly, with two narrow, transverse furrows near each other, and near the hinder edge of the appendage, the converging lateral borders of the appendage reaching only a very little distance (sometimes not at all ?) over the hindmost furrow.

Setae rather strictly paired, the lateral perhaps a little more so than the ventral, the difference scarcely noticeable; median-ventral distance a little smaller than the middle lateral ones, median-dorsal distance in general equalling half the circumference of the body (approximately $aa: ab: bc: cd: dd:=8: 3: 9: 3: 37$; $dd=\frac{1}{2}\mu$); towards the clitellar region the setae appear to be very slightly dislocated in a ventral direction, not so much so, however, as that the lateral ones could be called ventral. The setae are moderately large, the ventral very little larger than the lateral, but this difference is slight.

Clitellum annular, occupying segments XIV–XIX (=6), but becoming indistinct towards the intersegmental furrows XIII/XIV and XIX/XX.

Male sexual field nearly quadrate extending medio-ventrally between the intersegmental furrows XVI/XVII and XVIII/XIX, laterally extending very little over the lines of setae *b*, in general somewhat prominent, laterally distinctly bordered by a pair of straight, smooth, longitudinal walls which sometimes are marked by a lighter colour. 2 pairs of prostate pores in the middle zone of segments XVII and XVIII in the lines of setae *b* in the centre of more or less distinct circular porophores which occupy nearly the entire length of their segment. The prostate pores of each side are connected with one another by a straight, longitudinal, seminal furrow running exactly midway between the bordering lateral walls. At the points where the seminal furrows cross the intersegmental furrow XVII/XVIII, or very near this point, the male pores lie in the bottom of the furrows; they are very indistinct and could be recognised only in very thin horizontal slides.

Spermathecal pores, 2 pairs ventrally at the intersegmental furrows VII/VIII and VIII/IX, invisible exact in the lines of setae *b*.

Internal Anatomy. Septa V/VI-X/XI thickened, X/XI slightly, V/VI and IX/X a little more, VI/VII-VIII/IX rather strongly.

Alimentary canal. Oesophagus narrow, without a gizzard or any muscular thickenings, the masses of chromophil cells (pharyngeal glands) extend backwards to segment VIII; an unpaired chylous pouch depends ventrally from the oesophagus in the posterior part of segment IX. It is ovate, unstalked, only slightly narrowed at the base, composed of very numerous, parallel, thin, chylous tubes; a rather narrow axial lumen leads from the lumen of the oesophagus almost into the middle of the chylous pouch. In the anterior part of segment XIII the narrow oesophagus suddenly swells to form the wide intestine which has no typhlosole.

Last heart in segment XI.

Nephridia beginning in segment V; in the anteclellar segments the nephridia are very small and slender, in the middle and posterior part of the body they are extensively covered by large, opaque, and very granular cells.

Anterior male organs. Two pairs of testicles depend free from the ventral border of septa IX/X and X/XI into the coelom of segments X and XI. Opposite to them and anterior to septa X/XI and XI/XII are two pairs of rather small male funnels; the male ducts, not distinctly seen, seem to be very tenuous, those of one side obviously are united before discharging through their male pore, their extreme ectal end, in the body wall above the male pore, is seen in horizontal sec-

tions as a very narrow, quite simple tube. 2 pairs of seminal vesicles depend from septum IX/X into segment IX and from septum XI/XII into segment XII; those of the anterior pair are rather large and multiple, consisting of a few irregularly pyriform sacs, those of the posterior pair in segment XII are rather small, normal sacs.

Posterior male organs. Two pairs of very long, slender prostates occupy the ventral parts of some segments from XVII backwards. The glandular part of the prostates is loosely coiled, occupying the ventral part of two or three segments; it is about 0.07 mm. thick and consists mainly of a thick glandular epithelium; the axial lumen is a very narrow channel. There are no remarkable muscles at this part; ectally the glandular part gradually narrows to the muscular duct which is irregularly bent, rather short and about 0.04 mm. in diameter at the centre; it becomes still narrower where it enters the body wall and discharges in a quite normal manner at the top of its porophore.

Spermathecae (fig. 9). Ampulla small, elongate oval, or inverted pyriform, its walls smooth and moderately thick, duct rather sharply set off from the ampulla, twice to thrice as long. In the ental two thirds it is about half as thick as the ampulla, in the ectal third it gradually narrows towards its ectal end. The lumen is a simple, narrow, straight channel only in the narrower ectal third of the duct, in the ental two-thirds of the duct is narrowly meandering or forms irregular spiral turns; it is invested by a moderately thick, but not quite uniformly thick epithelium which follows the meanderings and convolutions of the lumen in a lesser degree; on its exterior side the epithelium is covered by a moderately thick muscular layer which is smooth on the outside, this again bears on the outside a layer of very small, nearly globular glandular cells, a layer of unequal thickness, in places scarcely noticeable, especially thin at the ectal end of the duct, elsewhere moderately thick, imparting a certain roughness to the surface of the duct. There are no diverticula leading off from the lumen of the duct.

Remarks. *G. wemanus* belongs to the group *G. zanzibarius* Beddard (1894, p. 252), *G. habessinicus* Michaelsen (1913, p. 5, pl. ii, figs. 30-31) and *G. baski* Stephenson (1928, p. 1, text fig.) characterised by the situation of the prostatic pores — 2 pairs at segments XVII and XVIII. *G. zanzibarius* differs from all the others by the situation of the setae, which "are all of them decidedly ventral in position," whilst in the others the median-dorsal interval equals half the circumference of the body, it is not even a little less, as in *G. habessinicus*. The rest of the description of *G. zanzibarius*, especially in respect to the structure of

the spermathecae, is so incomplete that one cannot state what is its relationship to other species. *G. wemanus* agrees with *G. habessinicus* in having the median-ventral interval between the setae smaller than the middle lateral ones, in *G. baski* it is greater than the latter, in *G. zanzibaricus* equalling it. A character found only in *G. wemanus* is the possession of a second pair of seminal vesicles depending from sep-



Fig. 9. *Gordiodrilus wemanus*. Spermatheca, made transparent.

tum IX/X into segment IX; in the other species of the group there is only one pair depending from septum XI/XII into segment XII. As for the structure of the spermathecae, *G. wemanus* differs from *G. baski* and *G. habessinicus* in the absence of diverticula leading off from the lumen of the duct.

It is possible that *G. elegans* Beddard (1892, p. 84), with prostatic pores at segments XVIII and XIX, should be placed near to *G. zanzibaricus* group, as it is the only other *Gordiodrilus* provided with diverticula in the spermathecal duct.

Family EUDRILIDAE

Genus BETTONIA

BETTONIA MONTICOLA sp. nov.

Two adult and an immature specimen, from Kaburomi (about $1^{\circ}15'$ north lat., $34^{\circ}30'$ east long.), 10,500 feet, western slope of Mount Elgon, Uganda. 28.xii.33.

Paratypes from Amaler River (about $1^{\circ}50'$ north lat., $34^{\circ}40'$ east long.), 5,000 feet, western slope of Mount Debasien, Karamoja, Uganda. 14.xi. 1933.

External Characters. Length of adults 73–85 mm., diameters $3\frac{3}{4}$ –4 and $4\frac{1}{2}$ mm., 115 and 145 segments. (Contrasted with *B. lagariensis* Beddard, (see *Remarks*) which was 90 mm. long with a diameter of from 4–5 mm., it is slightly smaller).

Colour bluish violet dorsally, the remainder yellowish gray.

Body cylindrical anteriorly and somewhat depressed in the middle and posterior portion.

Head epilobous (about $\frac{1}{2}$).

Setae in general moderately large; those of segment XII and of some preceding it, especially the ventral ones, somewhat enlarged, the ventral setae of segments XIII, XIV and XVII smaller than the normal ones. In general the median-ventral distance is only slightly larger than that between the setae of the ventral pair and about as large as the middle lateral distances, the dorsal pairs are about $\frac{3}{5}$ as wide as the ventral ones, the median-dorsal distance seems to be slightly smaller than half the circumference of the body (impossible to measure accurately as the body wall is somewhat shrivelled into longitudinal folds); against segment XVIII the ventral setae are distinctly dislocated medially at the expense of the middle lateral distances, so much so that at segment XVIII the median-ventral distance equals the width of the ventral pairs, and is smaller than half the median lateral distances (in general $aa: ab: bc: cd=8: 6: 8: 4$; at segment XVIII $aa: ab: bc: cd=4: 4: 9: 3$; $dd=1\frac{1}{2}\mu?$). Of *B. lagariensis* Beddard only remarks that "the setae are wider apart in the case of the ventral couples than in the case of the lateral." He does not state that the setae of the ventral couples are remarkably distant from one another, and in fig. 36 of *B. lagariensis* at segment XVI they are indeed shown as hardly half as far from one another as the median-ventral distance. More anteriorly the ventral couples are even narrower, at segment VI for instance ab is hardly $\frac{1}{3}$ as large as aa , as the setae are, for the most

part, rather large in this region of the body, I dare not assume that their very characteristic arrangement in *B. monticola* could have escaped notice in *B. lagariensis*.

Clitellum apparently annular but ventrally showing a somewhat different glandular modification. It occupies segments XIV–XVIII but is only weakly developed in segment XVIII.

Secondary male pore unpaired, situated medio-ventrally at intersegmental furrow XVII/XVIII, a great hole with notched margin expanding between the lines of setae *a*, and with a rounded triangular contour, the anterior angle extending over the posterior part of segment XVII.

Spermathecal pores, 1 pair at the intersegmental furrow XII/XIII, their middle part just in the lines of setae *b*.

External organs of puberty: A lighter coloured, slightly prominent, not sharply edged, glandular cushion around the male pore, more distinct in its hinder semicircular part at segment XVIII than in its rounded square anterior part at segment XVII; a somewhat more prominent, transverse cushion ventrally on the forepart of segment XIII behind the spermathecal pores.

Internal Anatomy. Septa VIII/IX–X/XI greatly thickened, VII/VIII and XI/XII moderately, VI/VII and XII/XIII slightly thickened, those following, as well as septum V/VI, very thin.

Alimentary canal. A large barrel-shaped gizzard in segment V, 3 oval, unpaired, short-stemmed chylous pouches, tubule pouches, depend ventrally from the oesophagus in the posterior parts of segments IX, X and XI, a pair of lateral chylous pouches which are broadly ridged, discharge into the oesophagus in segment XIII. Intestine without a typhlosole.

Anterior male organs holoandric. Testicles unrecognizable. The sperm reservoirs are thin tubes closely and irregularly coiled, empty and apparently collapsed in the specimen examined; two pairs of large broadly sac-shaped multilocular seminal vesicles depend from the septa X/XI and XI/XII into segments XI and XII.

Posterior male organs. Glandular part of the euprostates thickly tubular, about $4\frac{1}{2}$ mm. long and 0.9 mm. thick, the ectal two-thirds running straight backwards, the ental third bent forward, closely attached to the ectal part. Glandular part smooth externally, covered by a thin muscular mantle about $50\ \mu$ thick; glandular epithelium irregularly thickened, in some places forming ridges as thick as $250\ \mu$, in other parts much thinner, in consequence the lumen is correspondingly irregular, tending to form zigzag bends which are, in general,

rather narrow. At its ectal end the glandular part of the euprostate is continued into a short muscular duct, about 0.45 mm. in diameter, which enters the hind pole of a large, oval, cushion-like, copulatory pouch about $2\frac{1}{2}$ mm. long and 2 mm. broad. The longer axis of the two pouches converge against the median secondary male pore through which they discharge, their anterior poles being united. The wall of a copulatory pouch is very muscular, irregularly thick, the moderately wide lumen being narrowed by large ridges and walls. At the hinder pole of the copulatory pouch; a moderately large and conical penis projects into the lumen; this penis has a narrow, smooth, axial canal which is a continuation of the euprostate canal and discharges through one of the primary male pores at the top of the penis. The vasa deferentia coming from the anterior male organs enter side by side the euprostate at the ental end of its muscular duct, then bend and turn ectalwards to the muscular layer of the euprostate duct and penis. Here the two vasa deferentia of the corresponding side of the body obviously unite, for in the length of the penis I could recognise only one narrow channel near the axial channel of the penis (from the external view of the posterior male organs of *B. lagariensis* as figured by Beddard (1903, fig. 37) we may assume that their internal structure is essentially similar to that of *B. monticola*); in the act of copulation doubtless the two copulatory pouches will be pushed out with the result that the two extended penises will diverge from each other sufficiently to enable them to enter the two spermathecal pores so far distant from one another.

Female organs and spermathecae in general symmetrically paired, the two connected with each other by a supraoesophageal coelomic tube. The apparatus of one side exhibits the following structure. The spermathecal pore leads into a stoutly pyriform, though slightly narrowed in its ectal portion, spermatheca with a rather narrow, irregular lumen and a very thick muscular wall. The spermatheca lies not quite freely in the body cavity of segment XIII, at least its broader ental part is enveloped by a very delicate membrane, which, I suppose, is part of an ovarian bladder which in the meantime envelops the female funnel. (I could not recognise this envelopment at the basal part of the spermatheca). The lumen of the spermatheca seems to end blindly, no definite opening into the ovarian bladder being recognisable, but in the thick wall of the ental pole of the spermatheca irregular narrow fissures were detected some of which certainly opened into what is presumably the ovarian bladder. (The passage of the spermatozoa from the spermatheca into the female

apparatus obviously resembles that recognised by Michaelsen (1905, p. 343) and by Cognetti (1910, p. 4 and fig.) in certain species of the genus *Pareudrilus*). A very slender, club-shaped, thin-based ovarium arises from the hinder side of the ventral part of septum XII/XIII slightly above its ventral margin and somewhat medially from the base of the spermatheca. It extends parallel with, and as far as the ental pole of the adjacent spermatheca; it is closely enveloped by a thin membrane, forming the tubular part of an ovarian bladder. This bladder, on reaching the ental end of the spermatheca, bends sideways inclining closely against the ental pole of the spermatheca with whose membranous covering it apparently coalesces (I was unable definitely to determine the relationships of these delicate membranes). Meanwhile the ovarian bladder, if I recognised it rightly, widens and envelops the female funnel also, the latter being closely attached to the spermatheca; there is then given off from the lateral portion of the ovarian bladder, a thin tubular continuation which, rising beside the oesophagus to which it is closely attached, enters into the dorsal part of segment XIII; on reaching the median-dorsal line of the oesophagus, this tube unites with that arising on the other side, the two together forming an unpaired coelomic tube which, encircling the oesophagus, connects both the female apparatuses. At the median-dorsal middle of this coelomic tube, it gives rise to a very small, blind sac which extends backwards for a short distance beside the dorsal vessel to form a small, unpaired coelomic sac; the pyriform, closed female funnel is rather closely attached to the ental part of the spermatheca and is apparently enclosed in the ovarian bladder; its broad, median pole appears to open by a narrow slit into the ovarian bladder. Its lumen is rather narrow and not quite simple. A narrow channel leaves its median part obliquely in a latero-posterior direction into the narrow and short stalk of a rather large, kidney-shaped egg sac whose base covers the posterior part of the female funnel. The narrower, lateral pole of the female funnel is continued into a slender female duct, which first proceeds sideways then bends backwards to reach the female pore at the intersegmental furrow XIV/XV. At the ental end of the female duct approximately at the ectal end of the female funnel, arises a moderately large, pyriform appendage which contains a moderately large, apparently not quite simple sperm chamber (Respecting *B. lagariensis*, Beddard's solitary noteworthy detail regarding these organs is that the muscular, basal part of the spermatheca is enveloped in a coelomic sac).

Remarks. It is with some hesitation that I describe these worms

as a new species, for in some respects they show a remarkably close resemblance to Beddard's *B. lagariensis* (1903, p. 213, figs. 36-37) from Lagari, Mau District, south of El Burgon Range, Kenya Colony, a locality about 150 miles southeast of the type locality of *monticola*. It might be better to consider my specimens as representing a race of *lagariensis*, but unfortunately the description of *B. lagariensis* is so incomplete that one cannot tell whether great differences exist in the organs not mentioned by Beddard. In any event there is a considerable difference in the arrangement of the setae between my specimens of *monticola* and those of *lagariensis* as shown in Beddard's fig. 36, which I dare not ascribe to errors of the English draftsman. In the foregoing description of *monticola*, other important differences between the two worms are noted in addition to omissions in Beddard's description.

B. monticola differs from the nearly related *B. adolphi-friderici* Michaelsen (1910, p. 62) principally by the structure of posterior male organs and of the female apparatus. In *B. adolphi-friderici* the copulatory pouches are distinctly separated, each discharging by means of a proper duct through the common secondary male pore, the glandular part of the euprostate is irregularly bent and does not form a single loop as in all other known species of this genus. The spermatheca in *B. adolphi-friderici* is shorter and broader than in *B. monticola*, all the female organs of the former are situated nearer to the base of the spermatheca than in the latter, while the ovarium with its ovarian bladder has quite a different shape to that of the *new* species.

B. budduensis Michaelsen (1910, p. 66) differs from all other known species of *Bettonia* in having the spermathecal pores situated in the lines of setae *b*.

Genus POLYTOREUTUS

POLYTOREUTUS LOVERIDGEI sp. nov.

Two specimens, of which the larger is designated as the type, from Golbanti (2°27' south lat., 40°7' east long.) on the Tana River, Kenya Colony. 22.vi.1934.

External Characters. Length of type 140 mm., diameter throughout about $4\frac{1}{2}$ mm., segments about 250. Length of paratype 90 mm., diameter $2\frac{1}{2}$ -4, segments about 175. Both specimens seem to be entire.

Colour of type in general smokey gray, of the paratype dark gray but chamois or approximately brown at the clitellum.

Body cylindrical.

Head prolobic, segments more or less distinctly triannulate.

Setae rather slender, especially anteriorly; at midbody $aa = 1\frac{1}{2}$ $ab = 1\frac{1}{2}$; $bc = ca$ 5 cd ; $dd = \frac{1}{2}\mu$.

Nephridiopores in the lines of setae cd .

Clitellum at segments XIV-XVII, annular; intersegmental furrow somewhat more tenuous though still distinct at the clitellum; nephridiopores rather more distinct at this point.

Secondary male pore situated medio-ventrally at intersegmental furrow XVII/XVIII at the summit of a transversely oval cushion which extends as far as the middle zones of segments XVII and XVIII. In the type a stump-like, cylindrical penis, somewhat longer than thick, and bearing the primary male pore at its summit, projects from the secondary male pore; in the paratype the penis is retracted so far that its primary male pore is on a level with the surface of the porophore.

Spermathecal pore concealed in a very slender transverse slit medio-ventrally at intersegmental furrow XVIII/XIX.

Internal Anatomy. In view of the fact that the anatomical characteristics of the anterior end are quite uniform in this genus, and in an endeavour to avoid mutilating the type, I have not dissected the region of the head, but confine my observations to the following. Septum XII/XIII is the last one somewhat thickened; a pair of stout, kidney-shaped, chylous pouches (ridged pouches with accretions of calcium carbonate) depend from the oesophagus in segment XIII. Intestine without a typhlosole.

Anterior male organs. A pair of seminal vesicles extend backwards through many segments posterior to septum XI/XII. Throughout their length they are closely attached to the alimentary tract, in the type as far as segments XXVI and XXVII, in the paratype as far as XXVII. In the type these seminal vesicles are closely attached to one another throughout their length except anteriorly; in the paratype they are separated except for some short tracts. Where separated, the vesicles have the shape of flattened rosaries, being swollen in the segmental areas and constricted sharply at the intersegments. Each individual bead of this rosary represents a flattened oval, being somewhat shorter than broad. In the type where the two seminal vesicles are closely attached to one another the swellings of the joints are only developed on the free side, at such a spot the double organ has the appearance of a flattened rosary divided longitudinally by a median cut.

Posterior male organs (fig. 10). A pair of euprostates pass from the medio-ventral male pore first sideways, then upwards and backwards through 3 or more (till 7) segments. Their glandular, ental part (*eu*) is sausage-shaped, about 11 mm. in length and at the ectal end *ca* 0.9 mm. thick, entalwards slightly diminishing in thickness, simply and more or less irregularly bent, closely attached to the intestine. Its wall is rather thick, consisting principally of long, slender, glandular cells placed vertically against the outer surface which is provided sparsely with muscle fibres; lumen moderately wide, somewhat reduced by 4 or 5 irregular, longitudinal ridges which project into it. In a

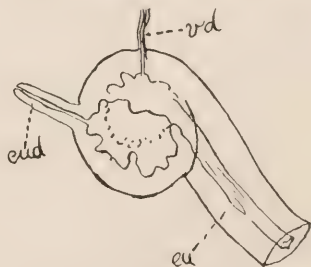


Fig. 10. *Polydoreutus loveridgei*. Ectal part of an euprostate with the ectal end of the relative vasa deferentia and the muscular euprostate duct.

transverse section its contour is very irregularly stellate. The ectal end of the glandular part is modified in a very characteristic manner; in the organ viewed "in toto" it looks like a somewhat flattened bulb which is nearly twice as thick as the unmodified euprostate tube from which it is sharply distinguished, at least posteriorly, less distinctly or not at all anteriorly. As viewed in a series of sections it appears somewhat different in the two specimens. In the cotype (fig. 10) this bulb appears as a somewhat widened continuation of the euprostatic tube which is curved to form a short, narrow, S-shaped, double loop only marked externally by a very slight furrow; walls and ridges of the main portion of the euprostate tube are continued into this modified terminal part where their regular longitudinal arrangement gives place to a very irregular one. The vas deferens (*vd*) reaches the bulb on the anterior side of its first or ental turn, its axial channel, piercing the wall of the bulb in a straight vertical line, discharges into the lumen in a quite simple manner. At the ectal pole of the ectal turn of the double loop arises the short, narrow, euprostate duct (*eud*) which is

almost entirely embedded in the body wall. In this region the internal surface of the rather compact and muscular body wall is quite plain without any internal thickenings, no copulatory pouch is formed. At this point the euprostate duct unites with its partner from the other side to form a single, unpaired, penial duct which contracts into some narrow, short loops and terminates in a short, free, conical penis surrounded by a narrow lumen. The rather compact male porophore

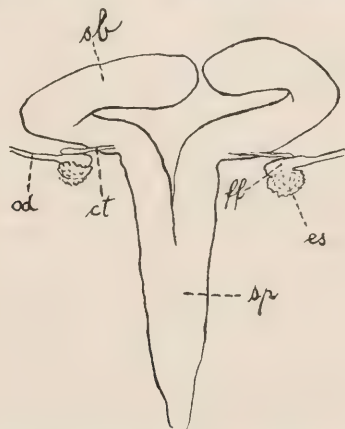


Fig. 11. *Polydora loveridgei*. Female organs and spermatheca.

forms, in its exterior part, a small penis pouch that is almost entirely filled by the penis. The primary male pore at the top of the penis is just level with the surface of the male porophore. In the type, however, the ectal part of the euprostatic apparatus has a somewhat different appearance: the ectal tract of the glandular part looks more like a simple, nearly elliptical bladder, the S-shaped double loop of the cotype is rendered indistinct, presumably by inflation, its lumen is rather wide at this spot and completely filled with fine granular secretions while the corresponding part of the presumably contracted paratype is quite empty.

Female organs and spermathecae (figs. 11–12). I could not recognise ovaries or ovarian bladders. The spermathecal pore at intersegmental furrow XVIII/XIX leads into an unpaired flattened tube (*sp*) which is anteriorly very narrow, then broadens to about 0.65 mm., is closely attached to the body wall and leads straight forwards to bifurcate at segment XVI. The two branches (*sb*) which are about as broad as

the unpaired posterior tube are at first closely attached to one another but later diverge widely. On reaching segment XIII the two branches bend sideways, upwards, and finally mediad, embracing the alimentary canal in the region of the paired chylous pouches; on the dorsal side of the oesophagus they meet without coalescing; the branches are stoutly club-shaped. The whole spermatheca and its branches have

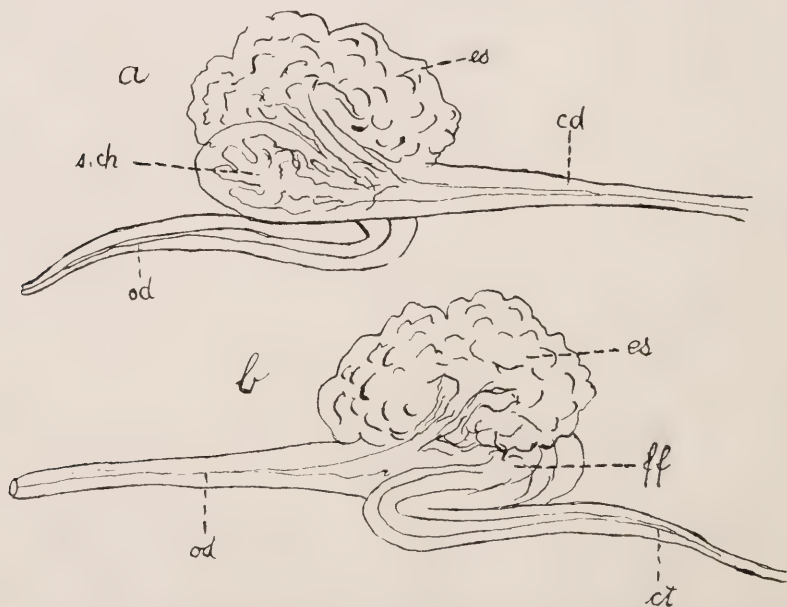


Fig. 12. *Polytoresutus loveridgei*. Female apparatus of the right side, *a* and *b* seen from different sides.

a rather thin wall and wide lumen; this lumen is filled with fine and evenly granular secretions, coloured light red in haematoxylin-eosin. In these secretions many slender, cylindrical, irregularly bent or curved, rather long (some fragments being about 0.3 mm. long), in places densely crowded spermozeugmas are embedded. Their structureless, light red axial portion is $18\ \mu$ thick, totally covered by the spermatozoan head-ends which are dark violet, almost black, and form a dense layer of about $6\ \mu$ thickness; the entirely pale caudal ends of the spermatozoa project freely into the mass of secretions. The indis-

tinnet female pores each lead into a slender, straight oviduct (*od*) which, passing mediad, enter an irregularly pyriform, rolled or closed female funnel (*ff*) whose narrow lumen is continued into three channels. One of these channels leads immediately into a large sperm chamber (*sch*) which occupies the strongly swollen, medial pole of the female funnel. The lumen of this sperm chamber is very irregular, being reduced by large ridges and walls projecting into it from the inner surface; the latter is festooned all over with the darkly coloured anterior ends of spermatozoa whose pale caudal ends project into the lumen. Another channel leads from the central lumen of the female funnel in a medio-dorso-ventral direction into the very short and narrow stalk of an irregularly kidney-shaped egg sac (*es*). This sac closely covers the whole dorsal side of the female funnel. The third channel leads from the central lumen of the female funnel into a long, slender connecting duct (*cd*). At the outset this duct forms two short and narrow loops which are closely pressed against the anterior side of the female funnel. Further on it narrows a little, passes freely mediad, and then joins the posterior wall of the spermathecal branch of its side. Finally becoming very thin, so that its axial lumen is hardly visible, it enters the spermathecal branch a short distance above its first lateral bend.

Remarks. This new species is closely related to *P. baralypton* Cognetti (1911, p. 507, figs. Aa and B), presumably from Nairobi, Kenya Colony, but differs from it in the following more or less important points. The seminal-vesicles (sperm-sacs) of *P. baralypton* are short, extending only into segments XII or XVIII, and each terminates posteriorly in a tubular appendix. In *P. loveridgei* these organs show large, moniliform swellings and extend as far as segments XXVI or XXVII. The question arises as to whether these organs are fully developed in the type of *P. baralypton* or whether their shape results from reduction with consequent systematic value.

The ectal part of the glandular tract of the euprostates is not modified in *P. baralypton* as in *P. loveridgei*, for in the former it is not distinctly set off from the euprostate middle tube, at most it is only slightly widened.

The female funnel and its appendages differ markedly in the two species; in the description of *P. baralypton* nothing is said of a sperm chamber, which is so distinct in *P. loveridgei*; in *P. baralypton* the connecting duct bears a large globular appendix near its medial end while I have been unable to find any trace of such an appendix in any one of the four females whose organs I have examined. I must confess that I do not altogether understand the author's description and figure.

Is that portion which he designates an egg capsule (fig. B.e.c.) homologous with the organ which I call ovarian bladder (Eitrichterblase), or is it part of the female funnel?

In my opinion the most striking differences between these two related species is to be seen in the shape of the medial part of the spermatheca, and in the presence or absence of a globular appendix at the connecting duct. The shape of the main portion of the spermatheca is narrow and only bifurcating about its middle in *P. loveridgei* whereas it is broadly swollen in segments XIV, XV and XVI, and only bifurcates in front of the base of the diverticula in *P. baralypton*.

POLYTOREUTUS MALINDINUS sp. nov.

One rather soft specimen, from Malindi (3°13' south lat., 40°8' east lat.), 50 feet, Kenya Colony. 30.vi.1934.

External Characters. Length 58 mm., diameter $1\frac{1}{2}$ - $2\frac{1}{2}$ mm., segments about 145.

Colour yellowish gray to yellowish brown.

Setae rather widely paired below, strictly paired laterally (approximately $aa: ab: bc: cd = 8. 6. 8. 3$), dorsal distance approximately equaling half the circumference of the body.

Clitellum occupying segments XIV-XVII (=4), apparently saddle-shaped, or possibly annular, though modified ventrally in a different manner and pale glandular, while laterally and dorsally yellowish brown.

Copulatory pores (fig. 13) unpaired, medio-ventrally. Male pore marked by a broadly triangular depression whose base is medio-ventrally placed at intersegmental furrow XVII/XVIII; the blunt anterior angle meets a small, slender transverse furrow somewhat behind the middle zone of segment XVII. I was unable to determine whether the male pore was actually situated in this transverse furrow or in intersegmental furrow XVII/XVIII, though I imagine that the latter is correct; the depression of the male pore is at segment XVII surrounded by a somewhat lighter, not sharp edged, scarcely prominent glandular modification; spermathecal pore rather indistinct, in a transverse furrow behind the middle zone of segment XVIII, apparently corresponding to the similar furrow at segment XVII, if not in the intersegmental furrow XVIII/XIX. A lighter, not sharp edged, scarcely prominent glandular modification surrounds the transverse furrow, reaching backwards as far as intersegmental furrow XVIII/XIX.

Female pores indistinct, laterally at segment XIV or XVI.

External organs of puberty (fig. 13) very characteristic: A large, transversely oval glandular cushion situated medio-ventrally at segment XIX of which it occupies the whole length, a second medio-ventrally placed cushion of different appearance at segment XXIV, not only occupying the whole length of this segment but encroaching on intersegmental furrows XXIII/XXIV and XXIV/XXV and almost reaching the centres of segments XXIII and XXV; in segment XXIV

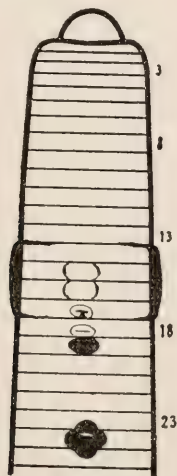


Fig. 13. *Polytoreutus malindinus*. Ventral view of the fore-end, schematically.

this cushion expands laterally to form a roundish projection on either side; the middle part of the cushion is flattened, if not slightly sunk, and bears a narrow, medio-ventral, transverse depression with spindle-shaped contour slightly anterior to the centre of segment XXIV. In addition to these postclitellar organs of puberty are two rather indistinct intraclitellar ones, two broad, medio-ventral cushions occupying the whole length and lower part of segments XV and XVI. These intraclitellian organs have somewhat the appearance of blunt-edged thickenings of the body wall.

Internal Anatomy. In order to mutilate the unique type as little as possible I have avoided dissecting the anterior end. Septum X/XI (as is presumably the case with some of those preceding it) is moder-

ately strongly thickened, septa XI/XII and XII/XIII slightly thickened, those following are thin.

Alimentary canal. The last unpaired, ventral, chylous pouch is in segment XI, it is tubular and stoutly ovoid with fairly numerous chylous tubules; a pair of elongate, broadly ridged, chylous pouches, together nearly encircling the oesophagus, present in segment XIII.

Anterior male organs: A pair of very broad testis sacs, in whose basal part are the testicles while the rest is filled with developing masses of sperms, occupy the entire length of segment XI, slightly narrowing at the base and somewhat more just before septum XI/XII where each continues into a very thin, tubular seminal vesicle of equal content. These tubes extend backwards through many segments and broaden to form the seminal vesicles proper; after reaching the posterior end of the long euprostates, the seminal vesicles proper extend into segment XXXVIII. The sperm reservoirs are moderately stout, cylindrical, but not smooth being irregularly crenulated and incised by the septa. The sperm reservoir in the posterior part of segment XI appears to be thickly tubular with rather stout walls and an irregularly meandering lumen. There the ental end narrows and then enters the posterior part of the appropriate testis sac, after which it immediately widens to form the male funnel.

Posterior male organs somewhat severely damaged in sectioning as poorly fixed and consequently soft. Glandular part of the euprostates apparently rather long and moderately stout; there does not appear to be a common copulatory pouch, certainly not a conspicuous large one.

Female organs and spermathecal apparatus (fig. 14): The main part of the spermatheca is a simple, smooth, moderately long, about 0.25 mm. diameter tube (*sp*) which is loosely attached to the body wall in the medio-ventral line and extends backwards for a short distance behind the spermathecal pore region (this posterior part was damaged in preparation). This median spermathecal tube bears 6 or 7 pairs of pyriform diverticula (*dvr*) whose rather narrow stems are distinctly differentiated from the median tube; their main portion is rather large, bent upwards, loosely attached to the alimentary canal which is almost completely encircled by each pair and almost extending to the dorsal vessel. It is possible, though improbable, that a posterior seventh pair of diverticula may have been destroyed. The wide lumen of the thin-walled diverticula contains more or less thick masses of densely and irregularly coiled, filaceous spermoneugmas while the median tube, as well as the anterior branches, is empty in the present specimen; the fore-part of the median spermathecal tube in segment XIII is regularly

rounded, and gives rise to a pair of sharply set off, narrow stemmed anterior branches (*sb*) whose main part is irregularly cylindrical, usually about 0.35 mm. diameter. The stem, rather sharply set off from the main portion is moderately long and about 0.06 mm. diameter. The female apparatus lies posterior to the ental ends of the anterior branches of the spermatheca. No trace of ovaries or ovarian-bladders; the closed female funnels (*ff*) are regularly pyriform; their broad median pole is continued into a distinct connecting duct (*cd*) which enters

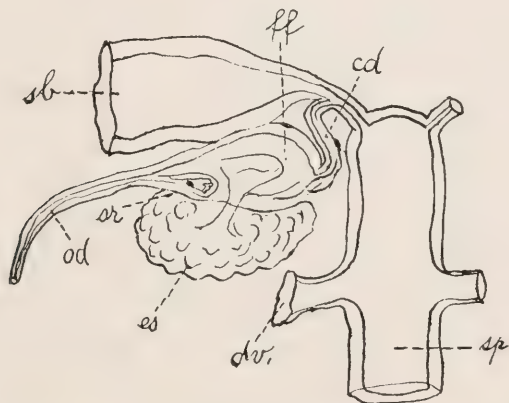


Fig. 14. *Polytreutis malindinus*. Female apparatus of the right side, and adjacent parts of the spermatheca, the hinder part of the latter, as well as the diverticles and the ectal part of the spermathecal branches being cut off.

the stem of the appropriate anterior branch of the spermatheca. The connecting ducts are about 0.5 mm. diameter throughout their length, moderately long, irregularly bent. The lumen of the female funnels is rather wide but not quite simple, somewhat conchoid. I failed to recognise any opening of any ovarian bladder into the body cavity of segment XIII. It gives rise to a narrow channel extending backwards into the short, narrow stem of a large, kidney-shaped egg sac (*es*) which lies just behind the female funnel and partly covers it. The thin lateral poles of the female funnels are continued each into a long, very slender (approximately 0.05 mm. diameter) oviduct. A pyriform sperm chamber (*sr*), with an apparently not quite simple lumen, is situated in the wall of the female funnel, or near its transition into the oviduct, into which the laterally directed, axial lumen of the sperm

chamber discharges the sperm chamber does not project above the general, smooth surface of the female funnel.

Remarks. *P. malindinus* belongs to the group of *P. violaceus* Beddard (1894, p. 230 and Michaelsen, 1897, p. 51); for further comments see under *P. bagiloanus* sp. n. on page 472, following.

POLYTOREUTUS ASKARORUM sp. nov.

One specimen, somewhat softened and with shrivelled cuticle, from Bagilo (about 6°50' south lat., 37°50' east long.), 6,000 feet, Uluguru Mountains, Tanganyika Territory. 20.x.1926.

External Characters. Length 140 mm., average diameter $4\frac{1}{2}$ -5 mm., anterior to the clitellum swollen to a diameter of about 6 mm., segments about 220, but this number is very inexact.

Colour in general yellowish, light ashy gray dorsally on the anterior part of the body.

Setae slender, not easy to distinguish in the shrivelled cuticle, doubtless arranged as in the other species of this genus.

Clitellum at segments XIV-XX (or XXI ?), indistinctly developed at segment XIV (and also XXI ?), anteriorly annular. In the clitellar region the intersegmental furrows are shallower, but not entirely eliminated.

Male pore (fig. 15) situated medio-ventrally at intersegmental furrow XVII/XVIII in the centre of a circular, whitish, glandular field which reaches nearly as far as intersegmental furrow XVI/XVII and XVIII/XIX; this male field does not project distinctly above the level of the body wall and can scarcely be called a male porophore.

Spermathecal pore indistinctly medio-ventrally at intersegmental furrow XVIII/XIX.

External organs of puberty (fig. 15) very characteristic, but rather indistinct in the softened and shrivelled type. In the centre of the anticitellar part of the body there is a medio-ventral, regularly elliptical copulatory field, nearly three times as long as broad, just beginning at intersegmental furrow VI/VII and extending backwards as far as furrow XI/XII, or possibly even beyond segment XII. In this present specimen the copulatory field is marked by a narrow, though rather deep, furrow at its border line, but apparently not by a glandular modification of the body wall. Intersegmental furrows are not obliterated in this area; at its posterior end the copulatory field appears to be open, the furrows bordering it are apparently continued

over segment XII in lines parallel to the axis of the body. Obviously there are postclitellar organs of puberty correlated with this anteclitellar organ, but they are rather indistinct in this specimen, in fact I did not recognise them until I specially examined the related region of the body as far behind the copulatory pores (the male and spermathecal pores) as the copulatory field lies before them. Then I recognised a series of medio-ventral, transversely-oval patches at segments XXIII, XXIV and XXV, even possibly at segments XX and

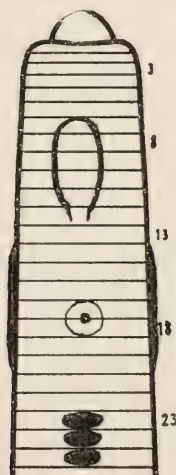


Fig. 15. *Polytreutis askarorum*. Ventral view of the fore-end schematically.

XXVI though scarcely recognisable. These patches are nearly as broad as the anteclitellar copulatory field, *i.e.* somewhat broader than long, occupying the entire length of their segment. They are distinguished only by a somewhat lighter colour and perhaps by a scarcely noticeable thickening of the body wall.

Internal Anatomy. Septa V/VI-X/XI very much thickened, XI/XII moderately thick, those following thin.

Alimentary canal. A rather small, elongate gizzard in segment V, 3 unpaired, chylous pouches depend ventrally from the oesophagus in segments IX-XI; paired chylous pouches, unrecognisable as the alimentary canal, is injured in this region.

Anterior male organs metandric. A pair of testicles depend from the ventral margin of septum X/XI into segment XI, each is enclosed

in a broad, cylindrical, testis sac which, arising obliquely, passes to the dorsal part of septum XI/XII; presumably these sacs penetrate this septum to be continued beyond as a pair of slender, tubular seminal vesicles. Actually, I did not see these tubular portions which are presumably collapsed, but I found, far behind the region of the sexual pores, two moderately long, stout, tubular seminal vesicles, one closely attached to the intestine, the other to the body wall, irregularly meandering through 5 or 6 segments. They are densely packed with spermogems, but I could not recognise any connection with the male organs of segment XI; doubtless the connecting tubes were destroyed. A pair of tubular sperm reservoirs lie in segment XI close in front of septum XI/XII; their ental part is thin, coiled, and partly (?) enclosed in the posterior part of the testis sacs, into which they doubtless open by means of their funnels; their ectal part, thick, and with a moderately wide lumen, descends in a straight line, and narrowing, pierces septum XI/XII, each being continued as a vas deferens.

Posterior male organs asymmetrically developed; only a single euprostate, that of the right side persisting; it is long, cylindrical though somewhat depressed, white, forming a double loop, attached to the intestine almost throughout its length, its rounded ental end lying in segment XXVI from where it passes forwards as far as into segment XIV, then turns backwards as far as segment XX, then finally forwards again; in segment XVIII it narrows and turns mediad enters the body wall, and apparently discharges in a simple manner through the median male pore at intersegmental furrow XVII/XVIII. The euprostate seems to be chiefly glandular without sign of muscular tissue either in its main portion or at its narrowed, ectal end, *i.e.* its duct. It is questionable whether the asymmetry of the euprostatic apparatus is normal, or should be regarded as abnormal.

Female organs and spermatheca (fig. 16): I could not detect ovaries, ovarian bladders, or ovarian channels; perhaps they were already macerated in the present specimen. The main part of the spermatheca (*sp*) is a moderately thick, unpaired median tube, closely attached to the body wall, extending from segment XIII into segment XX, where it ends in a small, nearly globular knob, thickest at segments XVII and XVIII. The underside of the organ, when dissected from the body wall, shows furrows corresponding to the intersegmental septa; these furrows are not continued over the upper side of the main spermathecal tube; the indistinct opening of the spermatheca lies a short distance in front of the posterior end. The forepart of the median spermathecal tube

shows no bifurcation, but the sides of its terminal tract in segment XIII are continued into a pair of transverse branches (*sb*) which are just as thick as the median part and not distinguished from it by any constriction. These cylindrical spermathecal branches have a rather long, rounded free end, bent upwards, and almost encircling the oesophagus in segment XIII. Between these branches and the terminal knob of the spermathecal tube in segment XX, 6 pairs of lateral

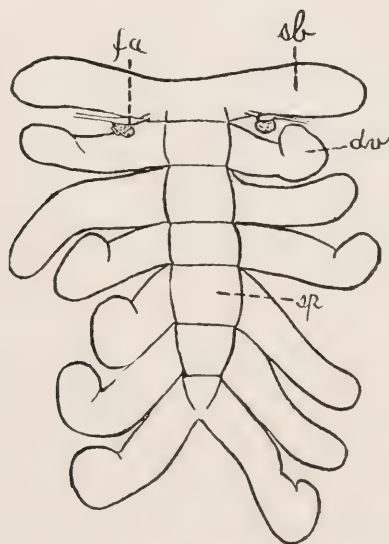


Fig. 16. *Polytoreutus askarorum*. Spermatheca and female organs.

diverticula (*dv*) arise out of the median tube, one pair in each of the six segments from XIV to XIX inclusive. These diverticula have nearly the same shape and size as the anterior branches of the main spermathecal tube, from which they are not sharply distinct; at the medial end they are not in the least narrowed, actually being so stout as to be in contact with one another. Like the spermathecal branches they are bent upwards, encircling the alimentary canal; they are not shaped as regularly as those branches, however; in places they are swollen, especially the 2 hinder pairs, or reduced while frequently the free end is bent off. The female apparatus is closely attached to the anterior branches of the spermatheca; to the posterior side of the

branches — a little distance to the side of where they spring from the median tube and rather far from the free ends of the branches — a closed female funnel is attached to each side. This funnel (*fa*), with a partly wide and partly narrow lumen, describes a double loop in its narrower part, bears a stout kidney-shaped, short-stemmed egg-sac at its upper side. Medially it is continued into a narrow, moderately long, connecting tube, which, becoming even more slender, enters the branch of the spermatheca near the point of its origin from the median spermathecal tube. The lateral pole of the female funnel is continued into a slender female duct; at the point of junction a pyriform sperm chamber discharges through a normal lumen which is closely draped by the dark-coloured, anterior ends of spermatozoa. This sperm chamber is almost wholly embedded in the stout wall of the female funnel, projecting but slightly over the outer surface of the funnel.

Remarks. *P. askorum* is closely related to *P. violaceus* Beddard (1894, p. 230) and Michaelsen (1897, p. 51), *P. malindinus* sp. n. described above, and *P. bagiloanus* sp. n. following. For further comments see *Remarks* under this last species.

POLYTOREUTUS BAGILOANUS sp. nov.

Two well preserved, adult specimens, from Bagilo (about 6°50' south lat., 37°50' east long.), 6,000 feet, Uluguru Mountains, Tanganyika Territory. 20.ix.1926.

External Characters. Length 50 and 60 mm., diameter about 2 mm., segments about 72 to 82.

Colour whitish, apparently not pigmented.



Fig. 17. *Polytoreutus bagiloanus*. Dorsal view of the head.

Head (fig. 17) tanylobous, if not prolobous; prostomium calotte-shaped; segment I is crossed by some longitudinal furrows, of these two, one on either side of the medio-dorsal line, appear to be somewhat sharper than the others, forming lateral borders of a dorsal appendage of the prostomium, making the head tanylobous. At their anterior end, however, is a slender transverse furrow looking like the posterior

border of the prostomium and making the head prolobous, if we do not admit as an appendage of the prostomium the two sharper furrows already mentioned.

Setae moderately large, medio-ventral distance only slightly greater than the distance between the setae of a ventral pair, approximately as large as the medio-lateral distances; the distance between the setae of a dorsal pair about half as large as the medio-ventral distance; medio-dorsal distance approximately equals half the circumference of the body (approximately $aa: ab: bc: cd=6: 5: 6: 3$; $dd=ca. \frac{1}{2}\mu$).

Clitellum chief annular, occupying the ventral portions of segments XIV-XVI (=3), dorsally segments $1/n$ XIII- $1/n$ XVII (=3 $2/n$), inclined against intersegmental furrow XII/XIII and XVII/XVIII.

Male pore distinct, marked by a brownish spot, medio-ventrally at intersegmental furrow XVII/XVIII in the centre of a transversely oval, almost circular, whitish, glandular field.

Female pores indistinct, laterally near, or in, intersegmental furrow XIV/XV.

Spermathecal pore indistinct, medio-ventrally at intersegmental furrow XVIII/XIX.

External accessory organs of puberty similar in both specimens, 3 medio-ventral, transversely oval, nearly circular glandular cushions occupying the whole length of their segment, 1 postclitellar very prominent cushion at segment XXII and 2 clitellar cushions, somewhat less prominent though at the same time somewhat larger as the real clitellar segment is longer than the ordinary segments, at segments XIV and XV.

Internal Anatomy. Septa V/VI and VI/VII very thin, VII/VIII-XI/XII moderately though distinctly thickened, IX/X-X/XI stoutest, XI/XII only slightly thickened.

Alimentary canal. A moderately large, cylindrical gizzard in segment V; 3 unpaired, chylous pouches depend ventrally, by a short and slender stem, from the oesophagus in segments IX-XI they are ovate, tubule pouches without a central lumen; a pair of lateral, chylous pouches ridged pouches, in segment XIII.

Anterior male organs. Testicles not recognised; a pair of testis sacs, in segment XI, rise from a narrower base in the antero-ventral part of their segment; they successively accrue, their broader part resting against the stout sperm reservoir in the posterior part of the segment where a tenuous seminal tube proceeds from them. This, going backwards through many segments, forms the anterior, tubular

part of a seminal vesicle and extends to segment XXXI just behind the posterior end of the euprostates. The tubular part of the seminal vesicles suddenly broadens to form the seminal vesicles proper which extends backwards through many segments, in a carefully examined specimen as far as segment LVIII. A true seminal vesicle is a broad, flat, irregularly lobed band, closely attached to the dorsal side of the intestine, and deeply grooved at the intersegments. A pair of large, ovate sperm reservoirs are situated ventrally in the posterior part of

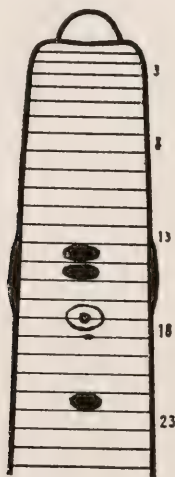


Fig. 18. *Polytreutus bagiloanus*. Ventral view of the fore-end.

segment XI; out of their upper pole arises a sharply distinct, very narrow, short tube which bends sharply downwards and soon after enters the anterior end of the tubular portion of the seminal vesicles where it doubtless ends in a small male funnel (not distinctly seen). At the lower pole of the sperm reservoirs a narrow tube arises in a similar manner and proceeding backwards forms a single male duct.

Posterior male organs. The euprostates have a long, tubular, colourless glandular part extending backwards into segment XXX. Its muscular coat is scanty and irregular, in places scarcely recognisable. Its lumen is moderately wide, irregularly constricted, reduced by some longitudinal walls composed of more or less thick glandular epithelium. The structure of the glandular part is similar to that of *P. violaceus* Beddard (1894, pl. xvi, fig. 3), but the muscular coat of

the latter seems to be thicker and more regular. The anterior ends of the glandular part are bent abruptly towards the middle and, without diminishing in diameter, unite in a short, transverse, common median part which, though of a similar diameter, differs by its glistening muscles. The male ducts enter the ectal end of the glandular part in an apparently normal, direct manner (not quite clearly seen).

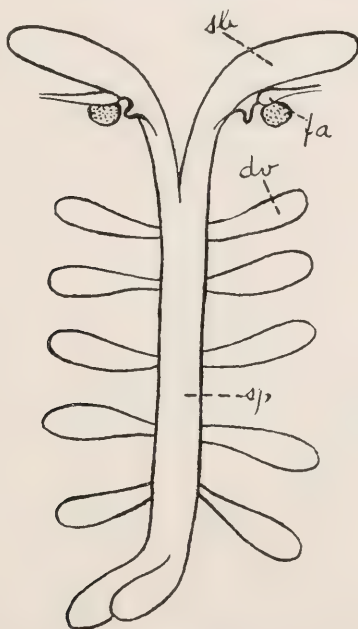


Fig. 19. *Polydoreutus bagiloanus*. Spermatheca and female organs.

Female organs and spermatheca (fig. 19): The main portion of the spermatheca is a median, smooth tube (*sp*) about 6 mm. long and 0.6 mm. broad, closely attached to the ventral body wall and reaching from segment XV into segment XX. A short distance before its posterior end it discharges through a minute conical duct. It bears 6 pairs of lateral diverticula (*dv*) which are arranged transversely as a rule. These diverticula are pyriform or elongatedly oval, somewhat narrowed at their ectal end, and not densely crowded but distinctly separated from one another, mostly somewhat bent upwards but by no means encircling the alimentary canal as they are far too short. The

diverticula of the posterior pair arise close beside each other from the posterior end of the common tube and are bent backwards. The anterior part of the main tube, reaches septum XIV/XV, and divides to form two branches (*sb*) which are about half as stout as the main tube. These branches diverge gradually at first, then more distinctly, bending sideways and upwards as they somewhat increase in size until they terminate in a globose blind end. The female apparatus (*fa*) is attached to the posterior side of the central and more basal part of the anterior branches of the spermatheca. The closed, pyriform, female funnel bears posteriorly a short and slender stemmed, large, sub-globular egg-sac. Laterally the narrower pole of the female funnel is continued into a slender oviduct, the wall of the ental end of the oviduct, as well as of the anterior side of the female funnel, contains some pyriform sperm chambers whose broad, blind ends project slightly beyond the outer surface of the organ. In part these sperm chambers seem to discharge through a common duct. Out of the broad medial pole of the female funnel arises a rather long, moderately and equally stout throughout its length, connecting tube which forms two wide loops before becoming attached to a spermathecal branch. Descending beside the latter, it finally enters the spermathecal branch at a point only moderately distant from the beginning of the median, unpaired, main portion of the spermatheca. I could recognise neither the ovaries nor ovarian bladders.

Remarks. *P. bagiloanus*, as well as *P. malindinus* and *P. askarorum* described above, together with *P. violaceus* Beddard (1894, p. 230, pl. xvi, figs. 3 and 7; Michaelsen, 1897, p. 51) and its variety *variabilis* Michaelsen (1897, p. 51) form a group of closely related species. As far as external characters are concerned these species may be readily distinguished by the number, arrangement, and shape of the external organs of puberty. *P. violaceus* and its variety have only a single postclitellar cushion. *P. malindinus* has two postclitellar cushions of different shapes, while the remaining species each have three glandular cushions similarly shaped, *P. askarorum* only postclitellar ones, *P. bagiloanus* a single postclitellar and two intraclitellar ones. As for the internal organization, the four species are best characterised by the shape of the spermatheca, whose differences are easily seen in the corresponding figures (Beddard, 1894, pl. xvi, fig. 7 for *P. violaceus*; and this paper, fig. 14 for *malindinus*, fig. 16 for *askarorum*, fig. 19 for *bagiloanus*).

POLYTOREUTUS MINUTUS Michaelsen

Polytoreutus minutus Michaelsen, 1912, Arkiv. Zool., **7**, No. 32, p. 2: Kenya district, Kenya Colony.

One specimen in good condition, from Mount Mbololo (about 3°20' south lat., 38°30' east long.), 4,800 feet, Teita, Kenya Colony. 13-18.iv.1934.

Locality. This additional material is especially valuable on account of its exact locality data, which was vague in the type. While Kenya Province covered a huge area extending from Thika in the south to the Northern Guaso Nyiro in the north, I am uncertain of the limits implied by Kenya district in 1911, presumably a small area around the mountain in Kenya Province, Kenya Colony.

Remarks. The specimen listed above is slightly larger than the type, being 42 mm. long and from 1.5 to 1.65 mm. in diameter with about 135 segments, whereas the type was only 32 mm. long and had 119 segments.

The male pore in the type "ziemlich gross, augenförmig" is marked in the Mbololo example by a rather deep, moderately broad hole which is inclined forwards against the middle zone of segment XVII. It is situated in the centre of an oval, whitish, glandular field which is somewhat longer than broad, and occupies the entire length of segments XVII-XVIII, even encroaching slightly on segment XVI.

POLYTOREUTUS CHALONERI Smith and Green

Polytoreutus chaloneri Fr. Smith and B. Green, 1919 (1920), Proc. U. S. Nat. Mus., **55**, p. 156, figs. 10-12: Mkonumbi, near Lamu, Kenya Colony.

One specimen, from Mkonumbi (2°16' south lat., 40°42' east long.), 50 feet, near Lamu, Kenya Colony. 21.v.1934.

One specimen, from Mombosasa (2°20' south lat., 40°30' east long.), near Witu, Kenya Colony. 31.v.1934.

Remarks. In the type from Mkonumbi, the copulatory pores (*i.e.* the male pore and the spermathecal pore) were surrounded by only slight thickenings of the body wall. In this fresh material, which includes a topotype and a worm from Mombosasa less than twenty miles west of the type locality, the body wall shows much more prominent modifications (fig. 20) in this sexual area. The entire ventral part of segments XVI-XIX has a somewhat glandular appearance without being sharply bordered. The male pore, marked by a small brownish pit, lies at the apex of a very prominent, nearly hemispherical

porophore. The circular base of this porophore occupies the whole length of segments XVI and XVII; the laterally distinct intersegmental furrow XVI/XVII is obliterated within the limits of the porophore with the result that the relation of the male pore to this furrow is not clearly recognisable in these specimens, I should have described it as "in or very near XVI/XVII" but it may have been displaced while the male pore was projecting. It is stated of the type that the male pore is "slightly anterior to the middle of segment XVII." Segments XVI-XIX are, at least laterally, distinctly divided into 3 annuli, each being separated by two fine secondary annular furrows. While the secondary furrows adjacent to furrow XVI/

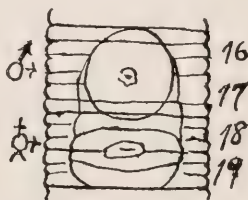


Fig. 20. *Polyoreutus chaloneri*. Ventral view of the region with the copulatory pores.

XVII vanish, like the latter, in the limits of the male porophore, the secondary furrows of XVI and XVII further from furrow XVI/XVII cross the male porophore. The area surrounding the spermathecal pore is also differently modified; the whole ventral portion of the body wall of segments XVIII and XIX is glandularly thickened, intersegmental furrow XVIII/XIX is very distinct in the region of this glandular thickening, but the secondary furrows, which are only laterally distinct, disappear here, and are replaced by deep, transverse, medio-ventral furrows in the middle zones of segments XVIII and XIX, dividing the ventral parts of these segments into two swollen, transverse fields; the fields adjacent to intersegmental furrow XVIII/XIX are somewhat more prominent than those bordered by furrows XVII/XVIII and XIX/XX. The spermathecal pore, a rather inconspicuous slit situated medio-ventrally at XVIII/XIX, is surrounded by a slight modification of the body wall, which forms a transversely oval field only distinguished by its lighter colouring and not very prominent.

POLYTOREUTUS MULTIPORUS Smith and Green

Polytoreutus multiporus Fr. Smith and B. Green, 1919 (1920), Proc. U. S. Nat. Mus., 55, p. 161, figs. 13-18: Mkonumbi, near Lamu, Kenya Colony.

Two specimens, from Mkonumbi (2°16' south lat., 40°42' east long.), 50 feet, near Lamu, Kenya Colony. 21.v.1934.

Four specimens, from Gongoni (3°5' south lat., 40°10' east long.), 75 feet, 10 miles north of Malindi, Kenya Colony. 27.v.1934.

One specimen, from Malindi (3°13' south lat., 40°8' east long.), 100 feet, 65 miles north of Mombasa, Kenya Colony. 30.vi.1934.

One specimen, from Changamwe (4°1' south lat., 39°37' east long.), 192 feet, 3 miles west of Mombasa, Kenya Colony. 4.vii.1934.

Remarks. The topotype from Mkonumbi, the only complete one, differs most noticeably from the type and cotype in its dimensions. It is exceptionally slender, about 270 mm. long and averaging about 3 mm. in diameter. The much greater number of segments, viz. ca. 670 is in conformity to its greater length.

The external organs of puberty exhibit some variation in number and character, most of the specimens from the new localities agree with the types in regard to their postclitellar setal papillae, having 9 or 10 papilla at each side of segments XIX-XXVII or XIX-XXVIII (in the types, 8 or 9 pairs at segments XIX-XXVI or XIX-XXVII).

The Gongoni series differ remarkably from the rest in having, without exception, 5 postclitellar segments with genital setal papillae, normally at segments XIX-XXIII except for one individual, and then only on its right side, where the papillae of the last pair are lacking in segment XXIII being displaced to segment XXIV.

In all eight specimens there occurs besides the posterior organs of puberty, some anterior ones, presumably lacking (at least not mentioned) in the types from Mkonumbi. These anterior organs have a two-fold character, firstly there are setal papillae, like the posterior ones, usually 2 pairs on either side of segments XV-XVI, rarely (in two examples from Gongoni) indistinguishable in part, once a pair of supernumary papillae on the left side of segment XIV; secondly in some specimens (from Gongoni and one from Mkonumbi) 2 large, medio-ventral, transversely oval, glandular cushions are present at segments XV-XVI, occupying the entire length of these segments and bearing on their sides the setal papillae, or rather the sexual setae, the papillae of these setae being more or less sunken in the glandular mass of the cushions and in consequence rather indistinct.

One of the Gongoni specimens bears a protruding penis (fig. 21) similar to that figured by Smith and Green (*loc. cit.* fig. 13) with which it agrees in its annulations but differs in the shape of its ectal end. The latter is somewhat broadened and truncated to form a generally



Fig. 21. *Polytoreutus multiporus*. Projected copulatory pouch of the right side.

plain surface which is not quite even but shows the external edges of some folds formed by the wall of the penis. The edges of these folds have the form of a 'W' above the middle line of which lies the apical plane of a transversely oval bladder. It should be remembered that a different degree of protrusion of the penis would presumably result in its ectal end taking on a somewhat different form.

BIBLIOGRAPHY

BEDDARD, F. E.

1892. "On a new Genus of Oligochaeta, comprising Five new Species belonging to the Family Ocneroдрilidae." *Ann. Mag. Nat. Hist.* (6), **10**, pp. 74-97, pls. vi-vii.
1894. "A Contribution to our Knowledge of the Oligochaeta of Tropical Eastern Africa." *Quart. Journ. Microsc. Sci., N.S.*, **36**, pp. 201-269, pls. xvi-xvii.
1903. "On a new Genus and two New Species of Earthworms of the Family Eudrilidae, with some Notes upon other African Oligochaeta." *Proc. Zool. Soc. London*, 1903, **1**, pp. 210-222, figs. 35-38.

MARTIIS, L. COGNETTI DE

1910. "Contributo alla Conoscenza della Fecondazione negli Oligochaeti." *Atti. Reale Acc. Sci. Torino*, **45**, pp. 737-750, pl. xiv.
1911. "Description of a new Species of the Genus *Polytoreutus*." *Ann. Mag. Nat. Hist.* (8), **7**, pp. 507-513, figs. A-B.

MICHAELSEN, W.

- 1897 (1896). "Neue und wenig bekannte afrikanische Terricolen." *Mitt. Mus. Hamburg*, **14**, pp. 1-71, pl., figs. 1-17.
1905. "Die Oligochäten Deutsch-Ostafrikas." *Zeitschr. Wiss. Zool.*, **82**, pp. 288-367, pls. xix-xx.
1910. "Die terrestrischen Oligochäten des tropischen Afrikas und ihre geographischen Beziehungen." *Wiss. Erg. deutsch-Zentral-Afrika-Exped. 1907-1908*, **3**, pp. 1-90, figs. 1-17, pls. i-ii.
- 1912 (1913). "Oligochäten vom Kenya-Distrikt in Britisch-Ostafrika gesammelt von der Schwedischen Zoologischen Expedition 1911." *Ark. Zool.*, **7**, No. 32, pp. 1-5, pl. i.
1913. "Oligochäten vom tropischen und südlich-subtropischen Afrika." II Teil. *Zoologica*, **67**, pp. 1-63, figs. 1-11, pls. i-ii.
1934. "Opisthopore Oligochäten des Königlichen Naturhistorischen Museums von Belgien." *Meded. Koninkl. Natuurk. Mus. Belgie*, **10**, No. 25, pp. 1-29, figs. 1-14.
- 1934a. "Die opisthoporen Oligochäten Westindiens." *Mitt. Mus. Hamburg*, **45**, pp. 51-64, figs. 1-7.

SMITH, FR. and GREEN, B. R.

1919. (1920). "Description of new African Earthworms, including a new Genus of Moniligastridae." *Proc. U. S. Nat. Mus.*, **55**, pp. 145-166, figs. 1-18.

STEPHENSON, T.

1928. "Oligochaeta from Lake Tanganyika (Dr. C. Christy's Expedition 1926)." *Ann. Mag. Nat. Hist.* (10), **1**, pp. 1-17, figs. 1-4.
1933. "Reports on the Scientific Results of an Expedition to the South-western Highlands of Tanganyika Territory. IV. Oligochaeta." *Bull. Mus. Comp. Zool.*, **75**, pp. 225-247, figs. 1-13.

11-2-1

Bulletin of the Museum of Comparative Zoölogy
AT HARVARD COLLEGE
Vol. LXXIX, No. 9

SCIENTIFIC RESULTS OF AN EXPEDITION
TO RAIN FOREST REGIONS IN EASTERN AFRICA

IX
ZOÖGEOGRAPHY AND ITINERARY

By ARTHUR LOVERIDGE

WITH FOUR PLATES

The Library
Museum of Comparative Zoology
Harvard University

CAMBRIDGE, MASS., U.S.A.
PRINTED FOR THE MUSEUM
OCTOBER, 1937

No. 9. — *Reports on the Scientific Results of an Expedition to Rain
Forest Regions in Eastern Africa*

IX

Zoögeography and Itinerary

BY ARTHUR LOVERIDGE

INTRODUCTION

GENERAL REMARKS

The Expedition, upon the results of which this paper forms the concluding report, was undertaken by the author as a Fellow of the John Simon Guggenheim Memorial Foundation.

The object in view was a clarification and extension of our knowledge regarding the distribution of the isolated, sylvicoline forms of life associated with the forest 'islands' of East Africa. In addition, an attempt has been made towards further elucidation of their relationship with the fauna of the great West African forests, particularly that of the Cameroon Mountains.

In this respect the work must be regarded as an extension of a programme outlined in 1924. This resulted in a visit to the forests of the Usambara and Uluguru Mountains of eastern Tanganyika Territory in 1926-1927, and those of the Uzungwe, Ukinga, Rungwe and Poroto Mountains in southwestern Tanganyika in 1929-1930.

The principal conclusions resulting from these trips were embodied in various reports such as "A Comparative Study of the Herpetological Faunae of the Uluguru and Usambara Mountains."¹ and the "Introduction and Zoögeography" to "Reports on the Scientific Results of an Expedition to the Southwestern Highlands of Tanganyika Territory."²

The latter paper, in particular, outlines (p. 27) the main points connected with the discontinuity of the distribution of wild life persisting in the remnants of primeval forest surviving on East African mountains, gives percentages of genera and species regarded as common to the Cameroon Mountains, and contains other pertinent matter which need not, therefore, be repeated here.

The Expedition of 1933-1934 consisted of the author, his gunbearer, and two native skinners. On this occasion forested areas lying to the

¹ Barbour and Loveridge, 1928, *Mem. Mus. Comp. Zoöl.*, **50**, pp. 87-265, pls. i-iv.

² Loveridge, 1933, *Bull., Mus. Comp. Zoöl.*, **75**, pp. 1-43, pls. i-iii.

northwest and north of the Usambara Mountains, were selected. The principal ones being Mounts Debasien (Kadam) and Elgon (Masaba) in Uganda, the Kakamega Forest at Kaimosi, and Mount Mbololo in Teita,¹ Kenya Colony. In addition many relic patches were visited as set forth in the itinerary given on pages 506-539 of the present paper.

In my 1933 report it was postulated that the amphibia, being of more sedentary habits and restricted in their migrations by their ecological necessities, were the most promising group of vertebrates from which to collect data that might throw light on this problem. In equatorial Africa, however, where there is an alternation of dry and wet seasons, the probability of one's finding frogs in the middle of the dry season is but slightly better than the likelihood of encountering them in New England in midwinter. With this in mind, the trip was planned so as to include and take advantage of both the "small" October-November rains of eastern Uganda, as well as the "big" monsoon rains of May and June on the Kenya coast.

Unfortunately Central Africa did not escape the extensive drought which, in 1933, assumed almost world-wide proportions. This drought adversely affected amphibian emergence during the first four months of the expedition. For example, at Kaimosi, which is in the region of the heaviest rainfall in Kenya, averaging 74.16 inches, and where records have been kept for thirty years, the millpond was lower than at any time during the three decades. Had not some showers occurred towards the end of February one wonders if our amphibian record would not have been as poor as that for Mounts Debasien and Elgon.

So severe was this East African drought that it formed a subject of discussion in the House of Commons. Sir Philip Cunliffe-Lister then stated that between January and April the Government spent £6,500 for famine relief in the Coast Province of Kenya alone. ("East Africa," 17. v. 34.)

When the big rains broke at last at the coast, they were exceptionally heavy, twenty inches *above* the normal falling during the months of April, May and June. Nor was this merely a local phenomenon of the Tana region, where I was at the time, for in the south the Zambezi was higher than within living memory, rising 77 feet in the gorge to a total depth of 135 feet. In the north the Nile flood reached its highest in forty years, inundating many small villages and towns as well as the northern and southern suburbs of Cairo. ("Times Weekly," London, 13. ix. 34.)

¹ The alternative of Taita, long in use by Zoölogists, was employed in the taxonomic reports, but should give way to Teita as it is the form adopted by the Government of Kenya.

DEFORESTATION AND EROSION

Rainfall, deforestation and erosion are so inseparably bound up with the whole problem of the survival of the sylvicoline fauna that it would appear appropriate to make some remarks on the subject at this point.

The tragic results of uncontrolled agricultural development and overstocking, recently culminating in the creation of the so-called 'dust bowl' in the middle western United States, is an object lesson which should not go unheeded in Eastern Africa. It must be remembered that these dire consequences have supervened after less than a century of exploitation of the land.

Owing to the unparalleled developments which have been taking place in East Africa during the last thirty years, extensive areas have undergone deforestation with the consequent disappearance of the specialized fauna inhabiting them. Only recently a conchologist of wide African experience told me how he had landed on a certain island in Lake Kivu in search of a species of snail known only from there. The virgin forest, which once clothed the island, had been destroyed to make way for coffee plantations. The slump in coffee prices had resulted in the virtual abandonment of the plantations. Not a living snail could be found, however, nothing but a few dead shells—the new conditions were inimical to the survival of the species.

The Teita porters who carried my loads up the almost precipitous ascent of Mount Mbololo, told me that they could remember when forest clothed the mountain side. Today only about a thousand acres of it survive as a narrow strip, two or three miles in length, running along the hog-backed ridge at 4,800 feet. This relic patch appeared to vary from one to two hundred yards in width. It is now under the protection of the Forestry Department of Kenya.

Though the plains below lay baking in sunshine by day, almost nightly during our stay fog or mist collected about the magnificent, though pitiful, remnant of forest. There it condensed in so heavy a precipitation that the drops fell like rain upon the tent, continuing to do so until several hours after sunrise the following morning. Before 8 A.M., a walk through the grass fringing the forest would leave one soaked. When digging for caecilians in the rich leaf mould of the forest floor, we always found the ground sodden. In the cool depths of the forest it was damp and pleasant throughout the day, however trying the heat and glare might be a few hundred yards outside.

Below the forest, the steeper slopes were strewn with rocks which protruded like the bare bones of the mountain through the scanty

covering of gravel which remained. Lower down, stunted scrub, a few scattered trees and sparse grass testified to the poverty of what little soil remained. Nevertheless, here and there were ravines where little marshes were fed by a trickle of water coming from a spring among the inhospitable rocks. Undoubtedly this water had percolated through from the forest above.

Recently the United States Forest Service has published data, obtained by actual measurement, bearing upon the protection from floods which is afforded by the action of forests in conserving the run off. There it is shown that forest soil in the Ohio Valley absorbs 50 times more water than does exposed earth, being 15 to 30 times more porous than field soil. Pasture land retains only a third to a twentieth of the amount which would be absorbed by an equal area of forest floor.

Thirty years ago Robin Kemp made a wonderful collection of small mammals on the southeast face of Mount Elgon. When I visited the locality in 1934, I found conditions very different from those which I anticipated in view of the species which he had encountered there in 1909. I therefore wrote to Mr. Kemp as follows: “. . . last year I camped half a mile above the cave which the natives still remember your having occupied. Could you tell me what the slopes were clothed with at the time of your visit? Today, as the result of annual burning, there is only thorn scrub and thicket with a few scattered baobabs, except along the upper reaches of the stream below the falls where a little rain forest still persists.” I might have added that great gulleys had been cut by the run off through the already semi-arid foothills lying between the escarpment and Bukori. In his most interesting reply to my letter, Mr. Kemp says: “The stream in those days was very much hidden. The whole ravine in front of the cave — from the Kirui plain upwards to as far as I climbed in the ravine — was a dense mass of green timbered virgin forest. I do not remember any sign of fire damage either along the bottom or along the tops of the trees.”

One feels that the changes which the region is undergoing impress themselves more forcefully on those who, like myself, revisit places after lengthy intervals. That certain settlers are alive to the dangers threatening, is evidenced by the formation of such organizations as the Soil Erosion Sub-Committee of the Subukia Farmers' Association. Mr. D. N. Stafford, in an address to the Uganda Planters' Association, remarked that: “The Kampala-Entebbe Road was once the pride of the country, the admiration of every visitor. Today most of the forest has been ruthlessly destroyed, and the beauty patches have dis-

appeared. What has happened on this road is going on in every road in Buganda." ("East Africa," 2. viii. 34.)

The regional governments have all sponsored investigations into one phase or another of the subject. In Tanganyika, Dr. E. O. Teale and Mr. C. Gillman recently issued their report on the menace to the future water supplies in the Northern Province. These authors state that some of the areas which they visited were already beyond hope of reclamation, and they urge prompt action as vitally necessary to save others which are threatened. Expensive as preventive measures often are, yet it is infinitely more economical than moving populations which may ultimately be the only alternative.

Of Nyasaland, Mr. A. W. J. Hornby writes: "Owing to the denudation of woodland areas, the gradual destruction of forest, and sudden floods, the country can be said now to be incapable of supporting half the population it did a hundred years ago." (1934, Nyasaland Bulletin, No. 11.)

Mr. E. J. Wayland, Director of Geological Survey in Uganda, states that the country, in common with many other parts of Africa, is drying up. A few years ago the influence of forests on climate and water supply in Uganda and Kenya was discussed at length by Mr. J. W. Nicholson, who visited East Africa at the request of the respective governments. In the report published by the Kenya Forest Department, this investigator states (1929, p. 35): "There is a great deal of evidence hydrological, geological and botanical, to show that parts of Africa are undergoing progressive desiccation. . . . There is some evidence to show that parts of Kenya and Uganda (*e.g.* Karamoja — Lake Rudolf) are in course of drying up." More pertinent, however, is "Our third conclusion is that under favourable circumstances mountain forests in East Africa can induce occult precipitation up to at least 25 per cent of the total annual rainfall." (p. 17.)

As a result of Mr. Nicholson's findings, the remaining patch of forest on Mount Debasien, in arid Karamoja, is being very strictly preserved. The measures taken included the moving of several native families who had squatted in the forest. On the western slopes of Elgon above Sipi, however, we found that the Bagishu were making heavy inroads into the forest, whether legally or illegally I did not ascertain; at least it was being done.

In so far as natives are concerned, the governments face a difficult problem with an expanding population. With a view to enlightening and instructing them, the Bantu Educational Committee has prepared a film on soil erosion, its causes and prevention. Native conservatism

will be difficult to combat and not many Governors speak so frankly as did Sir Harold MacMichael when addressing a gathering of 8,000 natives at Lushoto in the Usambara Mountains, in September, 1935. He charged them with the haphazard destruction of timber and the reckless wastage of a valuable heritage upon which their descendents would be dependent for a living.

Deforestation continues at this moment, and is likely to do so until an enlightened public, both native and European, supports the efforts of the Forest Departments in their arduous task of conservation. In so far as saving the sylvicoline fauna is involved, replanting appears useless, for, with a few exceptions, the forest-dwelling lower vertebrates do not adapt themselves to the types of trees (gums, wattle, etc.) which are so largely employed in replanting operations.¹

ZOÖGEOGRAPHY

ECOLOGICAL LIFE ZONES

It would appear that sufficient collecting has been done in East Africa to justify us in attempting to assign the herpetofauna to life zones with such a reasonable degree of accuracy that it should leave little room for criticism or the necessity for much future adjustment.

The most important contribution to an understanding of the distribution of African reptiles has been given by Schmidt (1923, pp. 4-45), though an increase in our knowledge in the years that have elapsed since the appearance of this paper, inevitably necessitates some amendment, and even difference of opinion. For an exhaustively detailed, first-hand account of the ecological habitats of the amphibia, one could not wish for a more interesting one than that of Sanderson (1936, pp. 165-187) dealing with an area in the Cameroons. In respect to certain collections from British Somaliland, northern Kenya, Angola and South West Africa, Parker (1932a, 1932b, 1936a, 1936b) has allocated his material to certain groupings which, though suitable for the regions in question, are neither wholly applicable nor adequate for the present area and purpose.

This area, embracing Kenya, Uganda, Tanganyika and Zanzibar, is referable to the Eastern and Southern Subprovince of the Ethiopian

¹Since this paper was written a year ago, much has happened. Of particular interest was the announcement in July, 1937 by His Excellency, the Governor of Kenya, that the Government was planning to initiate an extensive scheme of preventive measures aiming to check further erosion ("East Africa and Rhodesia," 29, vii. 37.)

Province as defined for botany by Engler. The herpetofauna of the area conveniently falls into nine ecological life zones of which the coastal merges into the savanna and the latter into the upland, though to a less extent.

Most writers have been embarrassed by the ubiquitous, widespread species that occur in several habitats, the usual practice has been to assign them to a separate group (Parker, 1932a, p. 213). This practice, however, has the disadvantage of giving an incomplete picture of the fauna of the separate zones. In the present paper, therefore, I have adopted the course of repeating immediately after the name of each species, the numbers of the other zones in which it occurs should it inhabit several.

Even so, exceptions were made in the case of the Northern Desert Zone which was created for a special purpose, and again for the Forest-edge Zone where most of the true forest species might supposedly be encountered at times. The inclusion of their names would result in unnecessary repetition.

Perhaps it would be as well to remind readers that the life zones to which the species are assigned are those that they occupy in East Africa. It is conceivable that in other regions they may be found at very different elevations. As a case in point, I imagine that in South Africa such snakes as *Pseudaspis*, *Duberria*, and *Trimerorhinus* are by no means restricted to grassy uplands about and above 5,000 feet.

For the benefit of those who are interested in the grouping of the virile, ubiquitous types referred to above, I list below as representative of the most adaptable species of the Ethiopian herpetofauna, most of those which occur in three or more of the zones here adopted.

Crocodylus niloticus

Pelomedusa galeata

Pelusios n. nigricans

Varanus niloticus

Mabuya maculilabris

Mabuya megalura

Mabuya v. varia

Brookesia k. kersteni

Python sebae

Natrix o. olivacea

Boaedon lineatus

Chlorophis neglectus

Dasypeltis scaber

Thelotornis kirtlandii

Dispholidus typus

Calamelaps unicolor

Causus resimus

Causus defilippi

Bufo r. regularis

Rana g. bravana

Rana f. angolensis

Rana o. oxyrhynchus

Rana m. mascareniensis

Arthroleptis minutus

Phrynobatrachus acridoides

Phrynobatrachus natalensis

The fact that Parker (1936a, p. 118), when dealing with the Angolan fauna, also includes *Hemidactylus mabouia*, *Gerrhosaurus flavigularis*, *Chamaeleo dilepis* and *Causus rhombeatus*, is not indicative of any difference of opinion regarding them, but results from the difference of the zoning employed. In the east these reptiles are restricted to the coast and savanna zones, though possibly *dilepis* might be included with the forest-edge group of chameleons. The point is a very minor one.

LIST OF THE LIFE ZONES ADOPTED IN THIS PAPER

| | |
|---|---------------------------------|
| 1. Marine. | Sea level. |
| 2. Freshwater Rivers, Lakes and Swamps. | <i>circa</i> 1- 5,000 feet. |
| 3. Littoral Rocks. | <i>circa</i> 1- 10 feet. |
| 4. Northern Desert. | <i>circa</i> 1,000- 3,000 feet. |
| 5. Coastal Plain. | <i>circa</i> 10- 1,000 feet. |
| 6. Upland Savanna | <i>circa</i> 1,000- 6,000 feet. |
| 7. Grassy Uplands and Alpine Meadows. | <i>circa</i> 5,000-12,000 feet. |
| 8. Forest-edge. | <i>circa</i> 3,000-10,000 feet. |
| 9. Rain Forest, usually Montane. | <i>circa</i> 3,000-10,000 feet. |

Zone 1. Marine

The wholly marine reptiles resident in the Indian Ocean off the East African coast, consist of four turtles (with the possible addition of the recently described *Caretta gigas* Deraniyagala, if recognizable) and a sea snake. I am unaware of any definite, specifically-localized records of the taking of the luth (*D. coriacea*) or brown and yellow sea snake (*P. platurus*) on the coast, though both are known to occur not far off.

Dermochelys coriacea
Eretmochelys imbricata
Chelonia mydas

Caretta caretta olivacea
Pelamis platurus

Zone 2. Freshwater Rivers, Lakes and Swamps

In this group we have a number of species whose life is conditioned wholly, or in part, by the presence of water, at least during a portion of the year. Among those reptiles for whose semi-aquatic habits water is essential, are the crocodiles, terrapin, soft-shelled tortoises and two species of snakes. By zoning them on this basis, we immediately eliminate the difficulty of the widespread distribution of many species, for it is the presence of water that governs their distribution, rather

than whether that water flows through coastal plain, savanna, grassy upland, or forest.

Schmidt (1919, p. 401) has attempted to separate the African chelonians according as to whether they occur within or without the forest: the exceptions, however, form a considerable percentage of the whole.

The lizards and snakes listed are species which dwell on the borders of streams and swamps, principally on account of their diet which, in so far as most of the snakes are concerned, is one of frogs and fish. The water cobra (*B. a. stormsi*) spends its days in the waters of Lake Tanganyika. The species of *Grayia* are only slightly less amphibious. The limbless *Melanoseps*, which may be really a rain-forest skink, appears to be surviving only where conditions are sufficiently moist for burrowing. On the plains such an environment was found in gallery forest along the Mkata River; in the Uluguru Mountains beside a waterfall whose spray kept the site moist; near a patch of forest on grass-grown uplands, yet another was found in sandy soil among the rotting roots of an old stump on the bank of a watercourse.

Among the amphibia, the caecilian (*D. gregorii*) is outstandingly conspicuous as a burrower in deep mud on the banks of the Tana River and beneath the waters of Lake Peccatoni. In this respect its environment is sharply distinguished from that of its rain-forest relatives, though a moist and permeable soil appears essential to both.

While it is true that the majority of frogs and toads require ponds or swamps in which to spawn during some part of the year, many are capable of existing under arid savanna conditions for many months at a time. Below are listed only those species for whom ponds and swamps seem so essential an element of their habitat that they naturally fall under this heading.

Crocodylus cataphractus in 6.

Crocodylus niloticus in 5, 6.

Pelomedusa galeata in 5, 6.

Pelusios sinuatus in 5, 6.

Pelusios n. nigricans in 5, 6, 9.

Pelusios derbianus (doubtful) 9.

Trionyx triunguis in 6, 9.

Cycloderma frenatum in 6.

Varanus niloticus in 3, 5, 6.

Melanoseps ater in 5, 6, 7, 9.

Python sebae in 5, 6, 9.

Natrix o. olivacea in 5, 6.

Glypholytus bicolor in 6.

Chlorophis hoplogaster in 6, 9.

Chlorophis neglectus in 5, 6, 9.

Chlorophis irregularis in 6, 9.

Grayia smythii in 6, 9.

Grayia tholloni in 6, 9.

Boulengerina a. stormsi in 6.

Dermophis gregorii in 5.

| | |
|---|---|
| <i>Xenopus l. petersii</i> in 6. | <i>Hyperolius</i> spp. in 5, 6, 7, 9. |
| <i>Xenopus l. victorianus</i> in 6. | <i>Rana g. bravana</i> in 5, 6. |
| <i>Xenopus l. bunyoniensis</i> in 7. | <i>Rana f. angolensis</i> in 6, 7. |
| <i>Xenopus l. borealis</i> in 6. | <i>Rana o. oxyrhynchus</i> in 5, 6, 7. |
| <i>Xenopus muelleri</i> in 5, 6. | <i>Rana m. mascareniensis</i> in 5, 6, 7. |
| <i>Xenopus clivii</i> in 4. | <i>Rana stenocephala</i> in 6. |
| <i>Megalixalus fornasinii</i> in 5, 6. | <i>Rana occipitalis</i> in 6. |
| <i>Megalixalus dorsalis</i> in 6. | <i>Arthroleptis</i> spp. in 5, 6, 7, 9. |
| <i>Megalixalus fulvovittatus</i> in 6. | <i>Phrynobatrachus acridoides</i> in 5, 6, 7. |
| <i>Megalixalus brachynemis</i> in 5, 6. | <i>Phrynobatrachus natalensis</i> in 5, 6, 7. |
| <i>Megalixalus flavomaculatus</i> in 5. | |

Zone 3. Littoral Rocks

The little skink which is listed below, enjoys the distinction of being exclusively an inhabitant of the littoral limestone or coral rag. In this situation, at times splashed by ocean breakers, it seeks its prey — the smaller crustacea.

Where the rocks are more or less overgrown with vegetation, one frequently encounters monitors, chiefly the eyed species, for the Nilotic monitor seldom strays far from the river estuaries. Both of these big lizards enjoy an extensive inland range.

Varanus ocellatus also 5, 6.

Varanus niloticus also 2, 5, 6.

Ablepharus b. africanus

Zone 4. Northern Desert

This zoning coincides with Parker's (1932b, p. 214) group IV of "Species endemic in the Somaliland region, sometimes extending into Kenya." While it contains three times the number of species listed by him as represented in the collection with which he was dealing, I imagine that we would be in entire agreement as to its composition.

Buxton (1937, p. 85) in a most interesting account of this region, with which I am personally unacquainted, prefers "semi-desert" for the area as a whole. In his article will be found an excellent detailed account of its physiographic, floral and faunistic aspects.

In northern Kenya Colony, from the Ethiopian and Somaliland boundary southwards to the equator, and just past it at Njoro, there is to be found a southward extension of desert life accompanying the slowly encroaching desert. Only 2 of the 15 forms listed have been taken south of this area. The single example of *H. citernii* found by me on a dump outside the lines of the King's African Rifles at Nairobi,

shortly after the return of a contingent from the north, was undoubtedly introduced. The second species, *E. neumanni*, described from just north of Lake Stephanie, was found to be firmly established at Ngatana, on the north bank of the Tana River, just south of 2° latitude. It is possible, therefore, that this species belongs to the coastal fauna rather than to that of the northern desert.

From Mount Longido in northern Tanganyika, northwards through Voi, we find a second desiccating area, largely on red laterite, which seems to be developing a somewhat similar fauna. However, the latter merges with that of the adjacent drier savanna areas to such an extent that its separation would result in extensive duplication. Species characteristic of this arid laterite region are listed separately and with the other savanna species of Zone 6 to which they belong.

In his first paper on the herpetofauna of the East African Lake region, Parker (1932b, p. 213) refers *Lygodactylus p. gutturalis* to his Group I comprised of "‘Eremian’ species, *i. e.* those found in Africa north of about the 10th parallel (north), Arabia, or both, and not extending southeast into Kenya." The latter part of this definition referring to Kenya would appear to be a *lapsus*, for on page 223 he records examples from Baringo and the Turkana Plains in Kenya. The position is somewhat clarified by his later (1936b, p. 602) describing of the race *keniensis* to which they would be referred. However, *L. p. gutturalis*, as I understand it, extends from its type locality Bissao, Portuguese Guinea, east to Uganda (Mbale, Karamoja, etc.) and southwards to Ujiji, Lake Tanganyika. I recently separated the Sudanese geckos under the name of *L. p. sudanensis*.

The saw-scaled viper (*Echis carinatus*) is likewise placed in his group of ‘Eremian’ species, though on p. 221 of the same paper, Parker records it from the mouth of the Kaliokwel River, *i. e.* about the 3rd parallel (north), and it has been recorded from this same general region by both Boulenger and myself.

Hemidactylus ruspolii
Hemidactylus macropholis
Hemidactylus citernii (see above)
Hemidactylus isolepis
Lygodactylus p. keniensis
Agama r. occidentalis
Eremias neumanni also 5.
Eremias smithi
Eremias striata

Philochortus i. rudolfensis
Leptotyphlops fiechteri
Coluber florulentus
Coluber smithi
Coluber keniensis
Echis carinatus
Xenopus clivii

Zone 5. Coastal Plain or Belt

The hot and humid coastal plain varies considerably in width though its altitude may be assessed as usually well under a 1,000 feet. Along the Tana River valley of Kenya its inland extension is as much as 150 miles, and almost as far along the line of the Central Railway in Tanganyika to Morogoro. On the other hand we find localities near to the coast, such as Amani at 3,000 feet in the Usambara Mountains, which indubitably belong to the forest zone.

While there is an interesting coastal fauna restricted to the palm-bearing, sandy plain in close proximity to the ocean, this region is principally populated by a far larger group with a high percentage of cosmopolitan species whose headquarters are the savanna. The first group is represented by a score of species,¹ half of which are burrowing, while there are nearly five times as many forms in the second.

From this it will be seen that ecological conditions in these two zones — the coast and savanna — often approximate, and coastal forms may find congenial conditions of life in a hot and humid montane valley even though it may exceed the 1,000 foot level. Nyange, in the Uluguru Mountains, provides just such conditions though its surrounding forest-clad heights support a forest fauna.

Fourteen reptiles, mostly snakes with a wide distribution, find conditions in patches of coastal bush and forest not too far removed from rain-forest conditions to prevent their occurrence in both habitats. Sternfeld's astonishing record of *Miodon gabonensis* from Dar es Salaam, is, however, omitted pending confirmation.

| | |
|--|--|
| <i>Crocodylus niloticus</i> also 2, 6. | <i>Hemidactylus frenatus</i> (introduced) |
| <i>Testudo p. babcocki</i> also 6. | <i>Hemidactylus w. werneri</i> also 6. |
| <i>Testudo tornieri</i> also 6. | <i>Hemidactylus t. squamulatus</i> also 6. |
| <i>Kinixys spekii</i> also 6. | <i>Bunocnemis modestus</i> |
| <i>Pelomedusa galeata</i> also 2, 6. | <i>Lygodactylus grotei</i> also 6. |
| <i>Pelusios sinuatus</i> also 2, 6. | <i>Lygodactylus p. mombasicus</i> also 6. |
| <i>Pelusios n. nigricans</i> also 2, 6, 9. | <i>Lygodactylus p. picturatus</i> also 6. |
| | * <i>Platypholis f. fasciata</i> |
| * <i>Diplodactylus wollerstorffi</i> . | * <i>Phelsuma laticauda</i> (introduced) |
| <i>Hemidactylus brookii</i> also 6. | <i>Agama m. mossambica</i> |
| <i>Hemidactylus parkeri</i> (insular) | <i>Agama a. lionotus</i> also 6. |
| <i>Hemidactylus mabouia</i> also 6. | <i>Agama atricollis</i> also 6. |
| * <i>Hemidactylus persimilis</i> | <i>Zonurus tropidosternum</i> also 6. |
| <i>Hemidactylus mandanus</i> (insular) | <i>Varanus albigularis</i> also 6. |
| | <i>Varanus ocellatus</i> also 3, 6. |

¹ Such are indicated by an asterisk in the following list.

- Varanus niloticus* also 2, 3, 6.
 **Chirindia ewerbecki*
 **Amphisbaenula orientalis* (? distinct)
Eremias neumanni also 4.
Eremias s. spekii also 6.
Eremias s. sextaeniata also 6.
 **Gastropholis vittata*
Gerrhosaurus m. major also 6.
Gerrhosaurus f. flavigularis also 6.
Mabuya maculilabris also 6, 9.
Mabuya planifrons also 6.
Mabuya brevicollis also 6.
Mabuya megalura also 6, 7.
Mabuya v. varia also 6, 7.
Mabuya striata also 6.
Riopa mabuiformis
Riopa tanae
Riopa sundevallii also 6.
Riopa m. modestum also 6.
Riopa pambanum
Ablepharus wahlbergii also 6.
Scelotes tetradactyla also 9.
Melanoseps ater also 2, 6, 7, 9.
 **Scolecoseps acontias*
Chamaeleon d. roperi also 6.
Chamaeleon d. quilensis also 6.
Chamaeleon d. dilepis also 6.
Brookesia brevicaudata also 6, 8.
Brookesia k. kersteni also 6, 8.

Leptotyphlops conjuncta also 6.
Leptotyphlops emini also 6.
 **Leptotyphlops boulengeri* (insular)
 **Leptotyphlops longicauda*
 **Typhlops lumbriciformis*
 **Typhlops braminus* (introduced)
 **Typhlops pallidus*
 **Typhlops u. unitaeniatus*
 **Typhlops platyrhynchus*
Typhlops s. mucruso also 6.
Python sebae also 2, 6, 9.
Natrix o. olivacea also 2, 6.
Natrix o. pambanum (insular)
Boaedon lineatus also 6, 9.
 **Lycophidion c. acutirostre* (insular)
- Mehelya c. chanleri* also 6.
Mehelya nyassae also 6.
Chlorophis neglectus also 2, 6, 9.
Philothamnus s. semivariatus also 6, 9.
Coronella coronata also 6.
Coronella s. semiornata also 6.
Prosymna a. stuhlmanni also 6.
Scaphiophis albopunctatus also 6.
Dasypeltis scaber also 6, 9.
Tarbophis s. semiannulatus also 6.
Tarbophis guentheri
Crotaphopeltis h. hotamboeia also 6.
Chamaetortus aulicus also 6.
Hemirhagerrhis kelleri
Rhamphiophis rostratus also 6.
Rhamphiophis rubropunctatus also 6.
Psammophis punctulatus also 6.
Psammophis sibilans also 6.
Psammophis subtaeniatus also 6.
Psammophis biseriatus also 6.
Psammophis angolensis also 6.
Thelotornis kirtlandii also 6, 9.
Dispholidus typus also 6, 9.
Calamelaps unicolor also 6, 9.
Micrelaps bicoloratus also 6.
Aparallactus turneri
Aparallactus concolor also 6.
Aparallactus uluguruensis also 9.
Naja nigricollis also 6.
Dendraspis angusticeps also 6.
Causus resimus also 6, 9.
Causus defilippi also 6, 9.
Vipera supercilialis also 6.
Bitis arietans also 6.
Atractaspis bibronii also 6.
Atractaspis microlepidota also 6.

Dermophis gregorii also 2.
Hypogeophis guentheri (insular)
Boulengerula changamwensis

Xenopus muelleri also 2, 6.
Bufo r. regularis also 6, 7, 9.
 **Bufo steindachnerii*

- Chiromantis p. petersii* also 6.
Chiromantis xerampelina also 6.
 **Leptopelis concolor*
 **Hylambates maculatus*
Kassina senegalensis also 6.
Megalixalus fornasinii also 2, 6.
Megalixalus brachynemis also 2, 6.
Megalixalus flavomaculatus also 2.
Hyperolius spp. (about thirty)
Rana g. bravana also 2, 6.
Rana floweri also 6.
Rana o. oxyrhynchus also 2, 6, 7.
Rana m. mascareniensis also 2, 6, 7.
Rana edulis also 6.
Rana d. delalandii also 6.
Arthroleptis s. stenodactylus also 6.
Arthroleptis minutus also 6, 7.
Phrynobatrachus acridoides also 2, 6, 7.
Phrynobatrachus natalensis also 2, 6, 7.
Hemisis m. marmoratum also 6.
Breviceps mossambicus also 6.
Spelaephryne methneri also 6.
Phrynomerus bifasciatus also 6.

Zone 6. Upland Savanna

The term savanna is used here in the rather broad phytogeographic sense of a tropical grassland containing scattered trees of a xerophilous type, locally known as 'miombo.' In this dry woodland *Brachystegia* and *Pterocarpus* are dominant with here and there a giant baobab. During the long dry season much of this country desiccates to such a degree that it can best be described as desert. In its more arid stretches dense thickets or scattered thorn bush prevail.

Such a type of country reaches its extreme in the Taru Desert area. As already mentioned when discussing the Northern Desert zone, we find a rather characteristic group of species inhabiting this arid laterite region which extends from Voi in Kenya to Kilimanjaro and Mount Longido in northern Tanganyika. The following are typical of this red soil country, to which they are apparently largely restricted.

- | | |
|---------------------------------------|--|
| <i>Agama r. septentrionalis</i> | <i>Rhamphiophis rubropunctatus</i> |
| <i>Geocalamus</i> spp. | <i>Dispholidus typus</i> (red phase) |
| | <i>Rhinocalamus dimidiatus</i> ? |
| <i>Eryx c. loveridgei</i> | <i>Micrelaps bicolor</i> |
| <i>Coronella s. fuscorosea</i> | <i>Naja n. nigricollis</i> (red phase) |
| <i>Dasyplettis scaber</i> (red phase) | |

R. dimidiatus is only known from Mpwapwa considerably to the south but may be confidently looked for in the northern area. All these species are referred to the Upland Savanna zone for the reasons already stated.

A second subgroup comprising some tortoises, the agamas, zonures and a couple of skinks, centre round the small rocky hills, denuded of soil by erosion, which are quite characteristic of the savanna.

It will be noted that I refer *Ichnotropis bivittata* to this group for I have encountered it in the hot and dry woodland savanna east of Lake Tanganyika, moreover I have captured its allies *I. squamulosa* and *I. capensis* (this last in Mozambique) under even more arid conditions on open plains almost devoid of trees, but with scattered patches of scrub. Parker (1936a, p. 118) places *bivittata* with the rain-forest fauna of Angola; while this may be the case on the other side of the continent it is a point worth reconsidering. *Chamaeleon etiennei* is another species which I should imagine is primarily a resident in orchard savanna rather than in the rain forest.

Crocodylus cataphractus also 2.

Crocodylus niloticus also 2, 5.

Testudo p. babcocki also 5.

Testudo tornieri also 5.

Testudo proceræ

Kinixys spekii also 5.

Kinixys belliana

Pelomedusa galeata also 2, 5.

Pelusios sinuatus also 2, 5.

Pelusios n. nigricans also 2, 5.

Trionyx triunguis also 2, 9.

Cycloderma frenatum also 2.

Hemidactylus tanganicus

Hemidactylus brookii also 5.

Hemidactylus mabouia also 5.

Hemidactylus w. werneri also 5.

Hemidactylus w. alluaudi

Hemidactylus t. squamulatus also 5.

Lygodactylus strigatus

Lygodactylus capensis

Lygodactylus scheffleri

Lygodactylus grotei also 5.

Lygodactylus p. gutturalis

Lygodactylus p. ukerewensis

Lygodactylus p. mombasicus also 5.

Lygodactylus p. picturatus also 5.

Pachydactylus b. turneri

Pachydactylus boulengeri

Agama r. septentrionalis

Agama h. armata

Agama m. montana

Agama a. agama

Agama a. lionotus also 5.

Agama a. usambaræ

Agama a. elgonis

Agama a. dodomæ

Agama a. ufipæ

Agama p. mwanzae

Agama p. caudospinosa

Agama atricollis also 5.

Zonurus tropidosternum also 5.

Zonurus ukingensis

Varanus albigularis also 5.

Varanus ocellatus also 3, 5.

Varanus niloticus also 2, 3, 5.

Amphisbaena phylofiniens

Amphisbaena mpwapwaensis

Geocalamus modestus

Geocalamus acutus

Nucras b. boulengeri

Nucras b. kilosæ

Eremias s. spekii also 5.

Eremias s. sextaeniata also 5.

Latastia johnstonii

Latastia l. revoli

Ichnotropis tanganicana

Ichnotropis bivittata

Ichnotropis squamulosa

Gerrhosaurus m. major also 5.

Gerrhosaurus m. zechi

Gerrhosaurus f. flavigularis also 5.

Gerrhosaurus f. nigrolineatus

Mabuya maculilabris also 5, 9.

Mabuya planifrons also 5.

- Mabuya brevicollis* also 5.
Mabuya megalura also 5, 7.
Mabuya q. obsti
Mabuya bayonii
Mabuya v. varia also 5, 7.
Mabuya striata also 5.
Riopa sundevallii also 5.
Riopa m. modestum also 5.
Riopa anchietae also 7.
Lygosoma gromieri (! Tsavo)
Ablepharus wahlbergii also 5.
Ablepharus megalurus
Melanosepa ater also 2, 5, 7, 9.
Acontias percivali
Chamaeleon anchietae
Chamaeleon senegalensis
Chamaeleon g. gracilis
Chamaeleon d. roperi also 5.
Chamaeleon d. quilensis also 5.
Chamaeleon d. dilepis also 5.
Chamaeleon b. bitaeniatus also 8.
Chamaeleon melleri
Brookesia platyceps also 8.
Brookesia temporalis also 8.
Brookesia brevicaudata also 5, 8.
Brookesia k. kerstenii also 5, 8.

Leptotyphlops conjuncta also 5.
Leptotyphlops emini also 5.
Typhlops s. mucruso also 5.
Typhlops s. excentricus
Python sebae also 2, 5, 9.
Eryx c. loveridgei
Natrix o. olivacea also 2, 5.
Glypholycus bicolor also 2.
Boaedon lineatus also 5, 9.
Lycophidion c. capense also 9.
Mehelya c. chanleri also 5.
Mehelya nyassae also 5.
Chlorophis hoplogaster also 2, 9.
Chlorophis neglectus also 2, 5, 9.
Chlorophis irregularis also 2, 9.
Philothamnus s. semivariatus also 5,
 9.
Philothamnus s. dorsalis
- Coronella coronata* also 5.
Coronella s. semiornata also 5.
Coronella s. fuscurosea
Grayia smythii also 2, 9.
Grayia tholloni also 2, 9.
Prosymna a. stuhlmanni also 5.
Scaphiophis albopunctatus also 5.
Dasypeltis scaber also 5, 9.
Tarbophis s. semiannulatus also 5.
Crotaphopeltis h. hotamboeia also 5.
Crotaphopeltis degeni
Chamaetortus a. aulicus also 5.
Amplorhinus nototaenia
Rhamphiophis acutus
Rhamphiophis rostratus also 5.
Rhamphiophis rubropunctatus also 5.
Dromophis lineatus
Psammophis punctulatus also 5.
Psammophis sibilans also 5.
Psammophis subtaeniatus also 5.
Psammophis biseriatus also 5.
Psammophis angolensis also 5.
Thelotornis kirtlandii also 5, 9.
Dispholidus typus also 5, 9.
Calamelaps unicolor also 5, 9.
Rhinocalamus dimidiatus
Micrelaps bicolor also 5.
Aparallactus jacksoni
Aparallactus lunulatus
Aparallactus guentheri
Aparallactus capensis
Aparallactus concolor also 5.
Chilorhinophis gerardi
Boulengerina a. stormsi also 2.
Naja h. haje
Naja melanoleuca also 9.
Naja n. nigricollis also 5.
Dendraspis angusticeps also 5.
Causus rhombeatus
Causus resimus also 5, 9.
Causus deflippi also 5, 9.
Vipera superciliaris also 5.
Bitis worthingtoni
Bitis arietans also 5.
Atractaspis bibronii also 5.

Atractaspis katangae
Atractaspis microlepidota also 5.

Scolecophorus kirkii also 9.

Xenopus l. victorianus also 2.
Xenopus l. borealis also 2, 7.
Xenopus muelleri also 2, 5.

Bufo carens
Bufo r. regularis also 6, 7, 9.

Bufo vittatus

Bufo parkeri

Bufo urunguensis

Bufo ushoranus

Bufo t. taitanus

Bufo micranotis also ?7.

Chiromantis p. petersii also 5.

Chiromantis xerampelina also 5.

Leptopelis bocagii

Hylambates verrucosus ?

Kassina senegalensis also 5.

Megalixalus fornasinii also 2, 5.

Megalixalus dorsalis also 2.

Megalixalus fulvovittatus also 2.

Megalixalus brachynemis also 2, 5.

Hyperolius spp.

Rana g. bravana also 2, 5.

Rana f. angolensis also 2, 7.

Rana floweri also 6.

Rana o. oxyrhynchus also 2, 5, 7.

Rana m. mascareniensis also 2, 5, 7.

Rana ansorgii

Rana stenocephala also 2.

Rana occipitalis also 2.

Rana edulis also 5.

Rana d. delalandii also 5.

Rana macrotympanum

Rana ornata

Rana pulchra

Arthroleptis botlegi (if it occurs)

Arthroleptis s. stenodactylus also 5.

Arthroleptis whytii

Arthroleptis moorii

Arthroleptis minutus also 5, 7.

Phrynobatrachus acridoides also 2, 5,
 7.

Phrynobatrachus natalensis also 2, 5,
 7.

Hemisus m. marmoratum also 5.

Hemisus m. guineensis

Breviceps mossambicus also 5.

Spelaeophryne methneri also 5.

Phrynomerus bifasciatus also 5.

Zone 7. Grassy Uplands and Alpine Meadows

At high altitudes in East Africa it is usual to encounter extremes of temperature which, on the plateaus particularly, are correlated with the presence of a usually treeless grassland. Nairobi (5,452 feet) is situated where the savanna steppe and this type of upland meet; in consequence it possesses a herpetofauna which is preponderantly that of the savanna with a small admixture of characteristically grassland species.

On reaching the alpine zone it is only natural to find the poikilothermous fauna much reduced. Such hardy species are marked by an asterisk (*) on the following list. Among them are two races of chamaeleon, occurring on Mounts Ruwenzori and Elgon, which are somewhat doubtfully placed here as they are most abundant along the upper limits of the forest. To restrict them to zone 8, however, would be

artificially curtailing their actual habitat for they do occur on the small shrubs and tree heaths scattered through the alpine meadows. It is possible that recognizable forms occur at a similar altitude on Mounts Kenya and Kilimanjaro; whether the names which have been proposed for *bitaeniatus* from these mountains are really applicable to recognizable montane forms has, as yet, to be demonstrated.

The accompanying list might be augmented by the inclusion of a number of widespread species of snakes such as *Python sebae*, *N. o. olivacea*, *P. sibilans*, *N. nigricollis*, etc., which in some localities may penetrate this zone from that of the savanna. To include them, however, would be to mask the true grassland fauna.

- | | |
|---|---|
| <i>Chamaesaura tenuior</i> possibly 6. | <i>Bufo r. kisolensis</i> |
| <i>Chamaesaura miopropus</i> | <i>Bufo l. lönnbergi</i> |
| * <i>Algiroides allenii</i> | <i>Bufo l. nairobiensis</i> |
| <i>Mabuya megalura</i> also 5, 6. | <i>Bufo mocquardi</i> |
| * <i>Mabuya v. varia</i> also 5, 6. | <i>Bufo t. uzungwensis</i> |
| <i>Mabuya v. brauni</i> (if distinct) | <i>Hyperolius spp.</i> |
| * <i>Mabuya irregularis</i> | <i>Rana wittei</i> |
| <i>Riopa anchietae</i> also 6. | * <i>Rana f. angolensis</i> also 2, 6. |
| <i>Melanoseps ater</i> also 2, 5, 6, 9. | <i>Rana o. oxyrhynchus</i> also 2, 5, 6. |
| * <i>Chamaeleon b. rudis</i> | <i>Rana m. mascareniensis</i> also 2, 5, 6. |
| * <i>Chamaeleon b. altaeeligonis</i> | <i>Rana m. uzungwensis</i> |
| <i>Lycophidion c. uzungwensis</i> | <i>Rana f. merumontana</i> |
| <i>Pseudaspis cana</i> | <i>Arthroleptis ukingensis</i> |
| <i>Duberria l. shiranum</i> | <i>Arthroleptis rungwensis</i> |
| <i>Trimerorhinus t. tritaeniatus</i> | <i>Arthroleptis minutus</i> also 5, 6. |
| <i>Trimerorhinus t. multisquamis</i> | <i>Arthroleptis parvulus</i> |
| <i>Vipera hindii</i> | <i>Phrynobatrachus kinangopensis</i> |
| <i>Xenopus l. petersii</i> also 2, 6. | <i>Phrynobatrachus acridoides</i> also 2, 5, 6. |
| <i>Xenopus l. bunyoniensis</i> also 2. | <i>Phrynobatrachus natalensis</i> also 2, 5, 6. |
| <i>Xenopus l. borealis</i> also 2, 6. | <i>Phrynobatrachus keniensis</i> |
| <i>Bufo r. regularis</i> also 5, 6, 9. | <i>Cacosternum b. boettgeri</i> |

Zone 8. Forest-edge

This otherwise unnecessary zone had to be erected for the reception of the many species of chameleon which, for the most part, are only found in association with rain forest though not necessarily resident in it. While it is certain that some of them live on the forest canopy, to what extent they do so is yet to be learned. Some of the species are

numerous in recently deforested areas, the majority are to be found on bushes and low trees adjacent to the forest in the highlands and mountains.

Naturally as the meeting place of the forest fauna and that of the adjacent zone, the heading of Forest-edge might be vastly extended to include all the forms of life occurring within and without the forest. Such action would defeat our purpose in zoning the herpetofauna, and so the list is confined to those species of chameleons for which it was created.

Chamaeleon b. bitaeniatus also 6.

Chamaeleon b. höhnelii

Chamaeleon xenorhinus

Chamaeleon carpenteri

Chamaeleon tenuis

Chamaeleon spinosus

Chamaeleon goetzei

Chamaeleon laterispinis

Chamaeleon incornutus

Chamaeleon tempeli

Chamaeleon f. fischeri

Chamaeleon f. multituberculatus

Chamaeleon f. tavetensis

Chamaeleon f. excubitor

Chamaeleon fülleborni

Chamaeleon werneri

Chamaeleon j. johnstoni

Chamaeleon jacksoni

Chamaeleon deremensis

Brookesia platyceps also 6.

Brookesia temporalis also 6.

Brookesia brevicaudata also 5, 6.

Brookesia k. kerstenii also 5, 6.

Zone 9. Rain Forest, usually montane

With the exception of the herpetofauna of the marine and northern desert zones, that of the rain forest, by reason of its specialization, stands out with greater distinction from the faunae of adjacent areas than is the case with any other group.

Nevertheless, even here there are a score of species occasionally occurring within the forest limits which are not typical of its facies. Such species have been placed in a separate category following immediately after that of the true sylvicoline fauna. Being composed of widely distributed forms, they are not considered in discussions of the true forest herpetofauna.

I imagine that *Boiga blandingii* should really be relegated to this group. I have had no personal acquaintance with this species in the field, but I am told by a West African resident that this reptile is commonly found in palm trees; that being the case I would suggest it belongs, together with *Dispholidus typus* and *Thelotornis kirtlandii*, in the subsidiary group of arboreal snakes which are as abundant in arid orchard savanna as in primary forest. Whether, as I imagine was

the case, these species originated in the primeval forest and later adapted themselves to life in the savanna, will ever remain a matter of opinion.

Some of the species of *Atheris* are also doubtfully sylvicoline, ultimately these tree vipers may have to be considered as forest-edge fauna. *A. nitschei* even appears to be adapted to bush in montane marshland as well as in the bamboo belt. Whether the skink, *Riopa fernandi*, is a true forest form is not clear. I have only taken it near the lake shore at Entebbe, though on former forest land. Entebbe is designated a rain-forest outlier by Engler (1908, *Vegetation der Erde*, 9, 1, part 1, pl. ii).

This raises another point which demands mention. Even a decade or two after deforestation has taken place, one may expect to find sylvicoline species here and there surviving under savanna conditions, especially where, as at Entebbe, scattered clumps of trees have been left standing. A case in point is that of the caecilian, *Scolecophorus kirkii*, which I have marked with a query. Though its relatives are all residents of montane forest, the only individual of *kirkii* which I have taken was dug up in savanna woodland on a high plateau where formerly forest existed. Whether the species is doomed to disappear, or whether it will be able to adapt itself to the changed conditions, will have to remain an open question for the present. Meantime it is accredited to both zones. An interesting account of the changes which are taking place in the composition of the amphibian fauna of deforested areas in the Cameroons, has been published recently by Sanderson (1936, p. 179).

I (1933, pp. 27-43) have already worked out the percentage of sylvicoline genera common to the Cameroon Mountains on the west and the Usambaras on the east. In the same paper tables were given of the vertebrate fauna of the forests of the Usambaras and the series of ranges lying to the southwest of them.

Two corrections to the lists are now necessary. *Lygodactylus conradti* of the Usambara and Uluguru Mountains, synonymized with *fischeri* of Sierra Leone by Müller must now be recognized as distinct. *Leptopelis rufus* recorded by Tornier from the Usambaras and by myself from the Uluguru range was based on adults of the frog described as *parkeri* by Barbour & Loveridge (Uluguru) and subsequently redescribed as *martiensseni* by Ahl (Usambara region). This further reduces the number of species with a transcontinental distribution in the forests to five reptiles and a single amphibian.

If we take the forest 'islands' in East Africa from the southeast to

the northwest, *i. e.* Usambara, Mbololo, Kilimanjaro, Meru, Kenya, through Kaimosi in Kakamega, to Elgon, we find only five species which are known from all, or almost all, viz.:

Lacerta jacksoni (yet to be recorded from Mt. Kenya).

Elapsoides güntherii (not recorded from Mbololo, Meru and Kenya).

Naja melanoleuca (absent from Usambara, Mbololo, Meru and Kenya).

Rana fuscigula chapini (present on all seven of the areas).

Rana oxyrhynchus gribinguiensis (not recorded from Kilimanjaro, Mbololo, Meru and Kenya, unless confused with the typical race). It is only right to add that Mbololo has undergone such deforestation that many of the species formerly inhabiting it have probably disappeared. Meru and Kenya are very little known from a herpetological point of view. Further we find two species which have developed eastern or western races, these are:

Cnemaspis a. africanus (on Usambara and Mbololo).

Cnemaspis a. elgonensis (at Kaimosi and on Elgon; the Kenya record probably refers to this race).

Typhlops p. gierrai (on Usambara).

Typhlops p. punctatus (on Kilimanjaro, Kenya, Elgon, etc.)

Finally there are two green snakes, obviously related, so long separated as to have become distinct species.

Chlorophis macrops (known only from the Usambara).

Chlorophis carinatus (Kaimosi, Elgon and west to the Cameroons).

The most interesting types of amphibian life in the Usambara and Uluguru Mountains are found among the caecilians and brevicipitids, for they furnish the greatest number of endemic forms and genera. Since the discovery of *Parhoplophryne* and *Hoplophryne* in 1926, Parker has monographed the whole family to which they belong. He refers the three species involved to the subfamily *Melanobatrachinae*, typified by *Melanobatrachus indicus* of India. Of all the members of the family, these three genera of brevicipitids are alone in possessing an incomplete auditory apparatus.

Parker (1934, p. 11), on the basis of their present distribution and area of greatest differentiation, postulates southeastern Asia as the centre of dispersal of the Brevicipitidae (*Microhylidae*). From thence they spread west and southwards into Africa. He logically assumes that the desiccation of northeast Africa in relatively recent geological times accounts for their extermination north of Kenya Colony.

Of the four genera comprising the other subfamily (*Brevicipitinae*), three (*Probreviceps*, *Callulina* and *Spelaophryne*) are endemic in Tanganyika Territory, while the fourth (*Breviceps*) extends from

Tanganyika southwards to the Cape. In view of the known facts of their present-day distribution, and confirmed by our futile search for brevicipitids in the montane forests to the north and west of the Usambaras, it appears improbable that they ever spread in that direction. The sylvicoline forms, like the caecilian genus *Scolecophorus*, after undergoing their greatest differentiation in the Usambara-Uluguru region, expanded towards the southwestern highlands of Tanganyika where continued humid conditions favour their survival.

Kinixys erosa ?

Cnemaspis a. africanus
Cnemaspis a. elgonensis
Cnemaspis quattuorseriatus
Lygodactylus conradti
Lygodactylus angularis
Lacerta vauereselli
Lacerta jacksoni
Algiroides africanus ?
Algiroides boulengeri ?
Bedriagaia moreaui
Holaspis guentheri
Riopa fernandi ?
Lygosoma kilimensis
Lygosoma aloysiisabandiae
Lygosoma g. graueri
Lygosoma m. meleagris
Lygosoma kutuensis
Scelotes eggeli
Scelotes uluguruensis
Scelotes tetradactyla and 5.
Melanoseps ater also 2, 5, 6, 7.
Feylinia c. elegans ?

Typhlops uluguruensis
Typhlops gracilis
Typhlops graueri
Typhlops p. punctatus
Typhlops p. gierrai
Typhlops kaimosae
Natrix o. uluguruensis
Bothrophthalmus l. lineatus
Boaedon olivaceus
Lycophidion meleagris

Hormonotus modestus
Mehelya capensis
Mehelya poensis
Chlorophis macrops
Chlorophis carinatus
Gastropyxis smaragdina
Hapsidophrys lineata
Thrasops j. jacksoni
Thrasops j. schmidtii
Rhamnophis a. elgonensis
Prosymna ornatissima
Geodipsas procterae
Geodipsas vauerocegae
Boiga blandingii ?
Crotaphopeltis h. tornieri
Crotaphopeltis werneri
Miodon gabonensis
Miodon christyi
Aparallactus werneri
Aparallactus uluguruensis also 5.
Aparallactus christyi
Elapsoidea guntherii (nigra type)
Naja melanoleuca also 6.
Dendraspis j. kaimosae
Causus lichtensteini
Bitis gabonica
Bitis nasicornis
Atheris squamigera
Atheris nitschei ?
Atheris ceratophorus ?
Atheris barbouri ?
Atractaspis irregularis
Atractaspis bipostocularis
Atractaspis conradsi
Atractaspis aterrima

| | |
|---------------------------------------|--------------------------------------|
| <i>Boulengerula boulengeri</i> | <i>Arthroleptides dutoiti</i> |
| <i>Boulengerula taitanus</i> | <i>Rana albolabris</i> |
| <i>Boulengerula uluguruensis</i> | <i>Rana f. chapini</i> |
| <i>Scolecophorus vittatus</i> | <i>Rana o. gribinguiensis</i> |
| <i>Scolecophorus uluguruensis</i> | <i>Rana m. venusta</i> |
| <i>Scolecophorus attenuatus</i> | <i>Arthroleptis poecilonotus</i> ? |
| <i>Scolecophorus kirkii</i> ? also 7. | <i>Arthroleptis s. lönnbergi</i> |
| | <i>Arthroleptis adolfriederici</i> |
| <i>Bufo brauni</i> | <i>Arthroleptis reichei</i> |
| <i>Bufo c. camerunensis</i> | <i>Arthroleptis schubotzi</i> |
| <i>Nectophrynoides tornieri</i> | <i>Arthroleptis rouxi</i> |
| <i>Nectophrynoides vivipara</i> | <i>Arthroleptis xenodactylus</i> |
| <i>Leptopelis johnstoni</i> | <i>Phrynobatrachus krefftii</i> |
| <i>Leptopelis vermiculatus</i> | <i>Phrynobatrachus dendrobates</i> |
| <i>Leptopelis aubryi</i> | <i>Phrynobatrachus graueri</i> |
| <i>Leptopelis notatus</i> | <i>Callulina krefftii</i> |
| <i>Leptopelis parkeri</i> | <i>Probreviceps m. rungwenis</i> |
| <i>Leptopelis uluguruensis</i> | <i>Probreviceps m. macrodactylus</i> |
| <i>Leptopelis karisembensis</i> | <i>Probreviceps m. loveridgei</i> |
| <i>Hylambates verrucosus</i> | <i>Probreviceps uluguruensis</i> |
| <i>Megalixalus uluguruensis</i> | <i>Parhoplophryne usambaricus</i> |
| <i>Hyperolius</i> spp. | <i>Hoplophryne uluguruensis</i> |
| <i>Arthroleptides martienseni</i> | <i>Hoplophryne rogersi</i> |

Additional species which sometimes occur in rain forest, though not typical of its fauna having invaded it from the adjacent savanna. Half of them occur in Zone 2, their distribution being conditioned by the presence of water.

| | |
|--|---|
| <i>Pelusios n. nigricans</i> also 2, 5, 6. | <i>Philothamnus s. semivariegatus</i> 5, 6. |
| <i>Pelusios derbianus</i> (doubtful) also 2. | <i>Grayia smythii</i> also 2, 6. |
| <i>Trionyx triunguis</i> also 2, 6. | <i>Grayia tholloni</i> also 2, 6. |
| | <i>Dasypeltis scaber</i> also 5, 6. |
| <i>Mabuya maculilabris</i> also 5, 6. | <i>Thelotornis kirtlandii</i> also 5, 6. |
| | <i>Dispholodus typis</i> also 5, 6. |
| <i>Python sebae</i> also 2, 5, 6. | <i>Calamelaps unicolor</i> also 5, 6. |
| <i>Boaedon lineatus</i> also 5, 6. | <i>Causus resimus</i> also 5, 6. |
| <i>Lycophidion c. capense</i> also 6. | <i>Causus defilippi</i> also 5, 6. |
| <i>Chlorophis hoplogaster</i> also 2, 6. | |
| <i>Chlorophis neglectus</i> also 2, 5, 6. | <i>Bufo r. regularis</i> also 5, 6, 7. |
| <i>Chlorophis irregularis</i> also 2, 6. | |

SUMMARY OF CONCLUSIONS

1. Any attempt to explain the present-day distribution of the East African sylvicoline herpetofauna, is rendered highly speculative on account of the absence of palaeontological data in the shape of tertiary fossil representatives of the group.
2. While probably never entirely continuous during any one period, more or less uninterrupted forest communication between the Usambara Mountains of East Africa and the Cameroon Mountains on the West Coast is postulated on account of the presence in both of such a highly specialized arboreal form as *Holaspis guentheri*.
3. Further evidence for such connection is to be found in the fact that the majority of the reptilian, and many of the amphibian genera are common to both ranges.
4. That the period of such connection was very remote is becoming increasingly clear from the accumulating data which demonstrates that very few *species* of the sylvicoline herpetofauna are common to both ranges.
5. In East Africa only seven sylvicoline species show anything like an uninterrupted distribution of the forested mountains lying between the Usambaras and Mount Elgon.
6. When one considers the endemic, sylvicoline genera of East African amphibia, those of the caecilians and brevicipitids, as well as *Nectophrynoides* among the bufonids, point to a continuity of the essentially humid conditions provided by forests in the direction of the southwestern highlands of Tanganyika, and not across the continent in a northwesterly direction.
7. Fresh data, pertinent to the enquiry, may be summed up as follows: The hitherto monotypic lacertid genus *Bedriagaia*, known only from the Ituri Forest of the Belgian Congo, is found to have a second species in the Usambara Mountains. The heretofore monotypic ranid genus *Arthroleptides*, supposedly confined to the Uluguru and Usambara Mountains, provides a second species on Mount Elgon. Additional records fill in the gaps of our knowledge of the distribution of the montane forms of *Cnemaspis africanus*, *Rana fuscigula* and *Rana oxyrhynchus*.
8. For the first time an attempt is made to assign every species (with the single exception of *Hyperolius* spp.) of amphibian and reptile

occurring in the British territories in East Africa, to its correct ecological habitat. Considerable ecological data resulting from the expedition has appeared already in the preceding reports of this series.

ACKNOWLEDGMENTS

I take this opportunity of expressing my indebtedness to the John Simon Guggenheim Memorial Foundation, without whose financial help these investigations could not have been made. To Mr. Childs Frick of New York, whose generous contribution defrayed the special expenses incurred in making the collection of mammals, including the pay of the two native skinners employed.

Mr. A. Walter of the Meteorological Service, through Dr. V. G. L. van Someren; and also Mr. H. B. Stoneham of Kitale, supplied me with valuable statistics regarding rainfall, which proved of great service in planning the trip. Later Mr. J. H. Robins of the Department of Public Works, Mombasa, whom I met at a ferry, went to considerable trouble to route me to Lamu, providing me with a sketch map and directions as to what to do should the lorry become bogged in the uninhabited stretches of the Tana delta during the 'big rains.'

To the Game Wardens of Uganda and Kenya for arranging special collecting licenses to cover the few species of game animals desired. To Mr. C. L. Hunter, Provincial Commissioner of the Eastern Province, Uganda, for a license to enter Karamoja District. I am also most grateful to Messrs D. Keith Burner and J. R. McD. Elliot, in charge of the Karamoja and Bugishu Districts respectively, for kindnesses received during my stay in their areas.

For hospitality and assistance I am indebted to the staff of the Friends Africa Mission at Kaimosi, Messrs A. B. Smith of Kibwezi, R. D. Milne of Witu, P. A. Petley of Belazoni, and many others.

ITINERARY

The following detailed information concerning the camps at which collecting was carried on, has been arranged in the order of the itinerary. Where, however, a locality was visited both upon the outward and return journey as was the case on the coast of Kenya north of Mombasa, the place is dealt with chronologically only on the outward trip. It might be noted that in the reports dealing with the material collected, the specimens are listed chronologically in the order of the itinerary.

After the name of the locality, the approximate position and altitude of the camp is given, followed by more precise data, where necessary, as to the location of the camp and the period during which collecting was carried out in the vicinity. This is intended to serve as a check to the dates on the labels accompanying the specimens in case the figures become defaced, or illegible, with the passage of time.

The climatic conditions are of such outstanding importance in the collecting of lower vertebrates that the meteorological aspect of each camp during our sojourn, is given in detail.

Where the place was already a type locality for vertebrates of which I was in search, the names of such are often listed as a guide to future collectors who may desire to secure topotypical material. I am inclined to think that the value of such material is insufficiently appreciated. Where a species has been described from some rapidly-developing centre such as Kampala or Mombasa, it may be already too late to obtain topotypes. This is particularly applicable to amphibians in districts where energetic anti-anopheline measures render pools uninhabitable for tadpoles.

In the systematic papers dealing with the vertebrates, the local names applied by the various tribes to the creatures taken in their vicinity, have been inserted. To be confident of absolute accuracy in regard to such names, one should really live for many years among that particular tribe. This being impossible, I have endeavoured to take reasonable precautions to secure accuracy, but it is to be expected that some errors will have crept in. Every native is not a zoölogist, but every native in his desire to be obliging is apt to call an animal by the name he thinks most applicable, should he be unfamiliar with the correct one. To avoid such errors, specimens were often submitted to groups of natives who argued or discussed alternative names before submitting the final opinion to me.

UGANDA

Karita River, Eastern Province. 1°33' N., 34°49' E. Alt. 3,000 feet.

A waterhole in the river bed west and slightly north of Kacheliba. The speedometer gave it as 66 miles by road and track from Kitale, Kenya Colony.

Camped, while awaiting the arrival of porters, from late on November 8 till we departed shortly after daybreak on November 10, 1933.

No rain. We had to dig deep for water in the broad stretch of sand which represented the Karita River, on whose bank our tents were pitched. A few hundred yards below the crossing there were some large pools of excessively foul water which were stagnating among the boulders in a rocky gorge. A high wind, while tempering the heat to some extent, rendered skinning exceedingly difficult. Still worse were the plague of domestic flies which infested the place, and rendered eating impossible unless a hand was waved continually above each mouthful.

Wild life, other than game, was abundant and wholly typical of this thorn-bush steppe. A pair of squirrels (*Heliosciurus m. elegans*) attracted attention by dropping discarded fragments of their meal upon the tent. With their exception no mammals were taken during the day. The morning was spent in shooting birds, the afternoon in collecting lizards. I was somewhat surprised to find that the lizards which darted about the paths and open places in this arid region were chiefly *Eremias s. sextaeniata* which, in this latitude, evidently inhabits the whole belt of dry country to the east coast.

The local Suk were entirely disinterested in us. Like their neighbours and sworn foes, the Karamojong, they are wholly engrossed with the welfare of their large herds of cattle. In the evening they brought the animals down to be watered.

As darkness fell the sixty odd Karamojong porters stalked into camp, weary from their long journey, but excessively garrulous notwithstanding. Their lanky build and slender legs proclaim the admixture of Nilotic blood in these primitive Half-Hamites. Their habit of standing to rest upon one leg reminded one of this trait among the Dinka. Less than half-a-dozen of these sixty-five porters wore any clothing whatever, the rest were entirely nude. Most of the 12,000 square miles of Karamoja is so hot by day as to render clothing superfluous.

Loborokojo, Eastern Province. circa $1^{\circ}27' N.$, $34^{\circ}46' E.$ Alt. 3,500 feet.

A midday halt near Greeki River about 10 miles southwest of Karita River. Here on November 10, a few geckos were found on tree trunks where, on the shady side, they found some shelter from the withering heat.

Aturai, Eastern Province. circa $1^{\circ}36' N.$, $34^{\circ}39' E.$ Alt. 3,500 feet.

Camped for the night of November 10 on the open plain.

The spelling is phonetically transcribed from the pronunciation of our Karamojong headman, another gave it as Atirwai. It is unknown to the Survey Department of Uganda, but is apparently near the place called Kabkwari on their map A 702. The whole desolate region is uninhabited at this season of the year.

The Karamojong, however, are a nomadic, pastoral people with ways akin to those of the Masai. Totally unused to portorage, a forty-pound load was as much as most of them could carry. Obsessed by the fear of thirst, resulting from their upbringing in this arid region, they daily exaggerated the distances between waterholes. At Aturai they unanimously asserted that it would be an eight-hour march to the next water. We set out with twenty gallons of water which I sent ahead for twelve miles, *i. e.* a four-hour march, presumably marking the halfway point of our journey. On arrival at this halt, which they called Kananyait ($1^{\circ}43' N.$, $34^{\circ}35' E.$ on Survey map A 702), they fell upon the water like wild things, spilling it wastefully as they fought for the possession of the drums. Three miles further on we reached a waterhole, Kanapo, where we camped! They had come this way only two days before yet could not differentiate between five and eight hours marching time.

Kanapo, Eastern Province. circa $1^{\circ}46' N.$, $34^{\circ}34' E.$ Alt. 3,500 feet.

A stagnant pool covered with thick scum and fouled by game. It was evidently a survival from a stream in whose bed it lay. For further remarks see preceding paragraph.

Camped for the night of November 11 on the path, as the eight-foot growth of rank grass hemmed us in.

Mount Debasien, Eastern Province. 1°50' N., 34°40' E. Alt. 5,000 feet.

Rising from the arid plains of southern Karamoja to a height of 10,050 feet, Mount Debasien (see Peters & Loveridge, 1936, pl. 2, fig. 2) or Kadam, as it is known locally, retains a small patch of virgin forest just below its western summit.

Camp, however, was made in gallery forest fringing the Amaler River at 5,000 feet.

Camped from November 12 to December 3, 1933.

The river (pl. 2, fig. 1) was but a shallow stream, yet it was the only water flowing on the western slopes so far as we could ascertain. Behind the camp was a dry watercourse whose broad bed was covered with pebbles and boulders (pl. 2, fig. 2), typical of some four or five similar watercourses which we explored. On November 15-16, fifteen hours of rain fell, but was so rapidly absorbed by the parched soil that there was little to show for it. A few pools formed in the river bed higher up the mountain, the larger ones were quickly fouled by thirsty buffalo, the smaller became the haunts of frogs (*Arthroleptis minutus* and *Phrynobatrachus natalensis*). Towards the end of our stay a few more heavy showers occurred, but exercised a negligible effect on the arid conditions which prevailed.

The rank growth of eight-foot grass which clothed the plain, extended up the mountain past our camp to about 8,000 feet. It was interspersed with acacia whose spreading tops, when viewed from afar, give a false impression of forest. The virgin forest, extending from about 8,000 feet to the base of the rocky mass which crowns the summit of the mountains is discussed elsewhere in this report.

Notwithstanding the fact that over 300 vertebrates, representing 80 species, were preserved, I do not think that I should be far wrong in saying that Debasien proved to be the most disappointing locality which I have ever visited. Not only did the rank grass, thorn scrub, and other natural obstacles make it difficult to get about, but they rendered collecting a more arduous undertaking. The two skinners, who had been sent to me at Kitale, proved to be unskilled and untrustworthy, necessitating much supervision.

Local natives brought in nothing. No Karamojong visited our lonely camp during the three weeks that we spent on the mountain.

Grecki River, Eastern Province. 1°34' N., 34°36' E. Alt. 3,000 feet.

Camp was made on the south bank, *i. e.* Bugishu district, near a recognized ford and fishing rendezvous which I later learned was known as Nabugut. It is indicated on the labels whether specimens were taken on the south, or north bank, *i. e.* Karamoja district.

Camped, while awaiting the arrival of porters, from noon on December 4 until 3.40 A.M. on December 7, 1933.

No rain. The withering heat was more oppressive than at any time during the course of the whole expedition. When the big rains are on, this region becomes a morass as was evidenced by the numerous footprints of elephant, giraffe, and other game. At the time of our visit, however, the soil was baked and fissured and the coarse dry grass waist-high. Attempts at burning the latter had been made without much success, so that one returned from every walk more or less blackened and always covered with ticks. Traps were set at the edge of burnt patches and resulted in the capture of a pair of rats which Dr. Allen has described as *Saccostomus cricetulus*. Their presence here constitutes a northwestward extension of the range of the genus. Other species such as *Mastomys c. tinctus* and *Lemniscomys s. massaicus* were also trapped, but though the traps were visited twice daily, we lost a number of skins whose fur slipped on account of the intense heat. Ants were also a source of trouble despite our ringing the traps with ash as a precautionary measure. Apart from two small parties of hartebeest and zebra, no game was seen during our short stay. A leopard visited the camp one night and a nearby grass-grown *donga* reeked with the odour of lions.

These plains being type locality for *Francolinus c. gedgii*, a series were collected as were also the smaller *F. s. granti* and larger guinea-fowl, *Numida m. major*, for game-birds were plentiful. Somewhat of a surprise was the finding of a scarce titmouse (*Anthoscopus musculus*) in such a region. Only common and widespread savanna forms of reptile life were encountered at this camp.

No natives were seen until the Sabei porters arrived from Nyenye to conduct us thither. We did the march in 4 hours and 5 minutes without a halt.

Nyenye, Eastern Province. 1°29' N., 34°31' E. Alt. 3,600 feet.

Nyenye is the spelling on the Uganda Survey map M 54, but on my labels it is written Ngange or Nyange after hearing it repeatedly spoken by several local natives. I am inclined to think that my spelling is the more accurate rendering for it has some phonetic connection with Mount Nyang (of the Survey map A 702) which lies just north of the Greeki River and due north of Nyenye. There is also a Nyange in the Uluguru Mountains of Tanganyika Territory, where I collected in October, 1926.

Nyenye lies at the northern foot of Mount Elgon. Our tents were pitched on the site of the government rest camp, a lovely location among tall trees with a river flowing close by. Forest francolin called in the underbrush but I was unable to get a shot at them; in fact a fruit pigeon (*Treron c. salvadorii*) was the only bird collected. A few reptiles and amphibians were taken in the late afternoon.

Camped from 8 A.M. on December 8, until 4.30 A.M. on December 9, 1933.

Sabei, Eastern Province. 1°24' N., 34°27' E. Alt. 6,230 feet.

Sabei is the spelling on Survey map M 54, as well as that employed by Johnston (1902, 2, p. 583) and on my labels. In their recent and authoritative work, Thomas and Scott (1935, p. 443), refer to it as. Sebei. As type locality of *Melittophagus l. oreobates*, it was rendered as Savé by Jackson, who with Gedge, in 1890, were the first white men to cross Mount Elgon, first seen by a European (Thomson) in December, 1883.

Stayed the weekend at the Government Rest Camp from the 9th till our departure at 5.30 A.M. on December 11, 1933.

No rain. After the grueling ascent from the hot plains, it was delightful to reach this well-kept camp on the main trail which encircles the mountain at this elevation. *Safari* duties, such as paying off porters and making the necessary arrangements for the future, occupied much of the day, but I was able to get out in the late afternoon. There was evidence that the former forest had been long since destroyed to make way for the intensive cultivation of this thickly settled area. The presence of *Rana f. chapini* was a token of previous forestation, but the only reptiles taken (*Lycophidion c. capense* and *Mabuya striata*) suggest immigration from the plains for these creatures, as is known to be the case with the Sabei inhabitants who are Half-Hamites of Nandi affinities.

Sipi, Eastern Province. 1°20' N., 3°24' E. Alt. 6,500 feet.

While Sipi rest camp is situated opposite the magnificent Tracy Falls at 5,979 feet, we marched for an hour further up the mountain and made camp beside the Sipi River in a clearing near the lower limits of the forest. Much of our material, however, came from the deforested and settled area lying between our camp and Sipi.

Camped from December 11 to 27, 1933.

Torrents of rain fell during the late afternoon on the day of our arrival. It rained almost daily at about the same time thereafter for a week, though progressively diminishing so we had some wholly fine days towards the end of our stay. These showers marked the end of the small rains. The ground on which we pitched our tents was so sodden with moisture that it welled up as one walked about the tent. The nights were so clammy cold that sound sleep was difficult.

The most remarkable thing about this camp was the almost complete absence of amphibia. All our efforts only resulted in the capture of three species. Of these *Phrynobatrachus graueri* was the only one with any claims to a forest association, the other two (*Bufo r. regularis* and *Rana f. angolensis*) are wide-spread savanna forms. The only possible explanations that occurred to me were the coldness of the water, the swiftness of the streams, and the numerous high falls. There were, however, marshy spots where the shallow and more or less stagnant water warmed up towards midday. Our search in both wild and domestic bananas proved futile.

Of eight species of lizards and chameleons taken, only three were forest forms. Of these one proved to be a new race of *Cnemaspis africanus* of the Usambara Mountains, so that Sipi becomes type locality for *C. a. elgonensis*. Over seventy snakes of eleven species were brought in by natives but only three species were sylvicoline. For one of these, *Chlorophis carinatus*, I claimed the first Uganda record, but while the report was in the press Pitman published on an example which he had taken in the Kigezi district of southwestern Uganda.

The Bagishu, who give the name of Bugishu to the whole district, are born hunters and were exceedingly helpful. They brought in the major portion of the hundred and eighty five mammals, representing thirty-two species, which we made into skins during the fortnight.

Kaburomi, Eastern Province. 1°14' N., 34°31' E. Alt. 10,500 feet.

Kaburomi (not to be confused with Kaburon on the northeast slope at about 8,000 feet) is situated in the alpine meadow zone of Mount Elgon. It is almost certainly the same as Gablaron and Kyeberem, both of which appear on map M 54 of the Uganda Survey Department. Kaburomi or Kaburom is reached after a five hours climb up a native path from our camp above Sipi.

Camped from noon on December 27, 1933, to 10 A.M. on January 1, 1934.

No rain, but the first two days were bleak and windy. Thereafter, though bitterly cold at night, the days were delightful and pleasant from an hour or so after sunup till a few hours before sundown, when it became chilly and bleak. Camp was made on an extensive grassy sward near a hut or *manyatta*, the only large area of level ground to be found in the vicinity. There were several big shady trees near the tents, for scattered trees persist in this zone for some little distance up the mountain.

Strangely enough, the only species of amphibian taken was of the savanna race of *Rana fuscigula*, i.e. *R. f. angolensis*, which appears to have either ascended the eastern slopes and spread downwards to Sipi, or else to have ascended the mountain by following the course of the Sipi, or some adjacent stream, thus driving a distributional wedge between the larger, forest form, *R. f. chapini*, which occurs at Sabei to the north, and Butandiga to the south, of Sipi.

Snakes and tortoises were said to be unknown at this altitude. Of lizards we only took four species during the four days collecting. A single example of the rare *Mabuya irregularis* constituted the first Uganda record, but the other three were abundant. These were *Algiroides alleni*, *Mabuya v. varia*, and a dwarf form of *Chamaeleon b. höhnelii* which I have named *C. b. altacelgonis* with Kaburomi as type locality. It is of interest to note that Roux (1936, p. 173), reporting on the collection made by Jeannel in the alpine zone, independently comments on the characteristics of this dwarf form.

The local Nderobo were very friendly and interested in us, but the population is sparse and scattered and the men preoccupied with the care of their cattle. They did contribute a serval, hyrax, and few species of rodent. I shot a topotype of the duiker (*Sylvicapra g. lobeliarum*), and saw Harvey's duiker, mountain duiker, mountain reedbuck and bushbuck, all rendered wary from much hunting by the Nderobo and their dogs.

Ridge Camp west of Madangi, Elgon. 1°12' N. 34°28' E. Alt. 11,050 ft.

I gave this name to our camp on the uninhabited ridge across the valley west or northwest of Madangi. Whether the name Omudaki, which seems to apply to the lower part of this spur on the Uganda Survey map M 54, is applicable, I cannot say.

Camped from 3 P.M. on January 1 till 10 A.M. on January 3, 1934, while awaiting porters from below Butandiga.

The climate at this season was delightful so long as the sun was shining, but bleak and chilly the minute it was obscured by clouds as frequently happened. A quarter of an inch of ice formed on our washbasins the first morning, rather less the second day. Underfoot the grass was tufty, short and springy. The dominant plants were giant groundse's (*Senecio Johnstoni* and *S. elgonense*) which, in places were so numerous as to provide some shelter from the bitter winds which swept across the ridge.

Mountain duiker, presumably *Cephalophus monticola musculoides*, were moderately abundant but very wild through much hunting. In fact during most of the day which we spent on this ridge, we could hear the tinkling bells on native dogs and the shouts of their owners as these sounds floated up from the valleys far below. Parties of Bagishu could be seen quartering all available cover in search of game. Apart from a hare or two, we saw no other mammals at this altitude, but there were signs in plenty that wild pig come up to root about among the lobelias and groundsel.

Bata'eur eagles, augur and mountain buzzards might be seen quartering the mountain sides, but though I went out for a couple of hours in the morning and again in the afternoon the only bird I succeeded in shooting was a European kestrel (*Falco t. tinnunculus*) which had eaten a skink. It seemed advisable to label this bird 'Madangi' as being the nearest recognizable locality.

Mr. Raymond Hook of Nanyuki, who knows Mount Kenya as well as most men, informs me that on that mountain lizards (presumably skinks) reach 15,000 feet, snakes 13,000, chameleons, frogs and toads only 11,000 feet. My own experiences on Mount Elgon revealed skinks (*M. v. varia*) at about 12,000, doubtless they attain the summit; chameleons (*C. b. altaelgonis*) and frogs (*R. f. angolensis*) seen at 11,500 feet. Snakes on the other hand were not seen above 7,000 feet and according to the Nderobo at Kaburomi, they do not occur there.

Madangi, Eastern Province. 1°9' N., 34°30' E. Alt. 11,400 feet.

Madangi (Mudange) is the site of a Government rest camp on the trail from Butandiga to Jackson's Summit, Mount Elgon. We pitched our tent among the disintegrating huts which comprised the rest camp.

Camped from noon on January 3 till nearly noon on January 4, 1934.

No rain, but overclouded till 4 P.M. while cold winds made it still less pleasant. The heather logs for the fire were damp and gave forth an inescapable acrid smoke which was blown in every direction by the bitter winds which whistled through the stockade that formed the walls of the rest house.

At daybreak we ascended to Jackson's Summit (13,650 feet), passing the small lake at 12,500 feet on which there was thin ice. Returning, we reached Madangi at 10 A.M. for breakfast, then continued on down to Butandiga (7,000 feet) which, together with the somewhat breathless ascent of the Summit, made a journey of eighteen miles that day.

As Madangi is situated in the alpine zone there are few trees, though tree heaths (*Erica arborea*), often smothered with lichen (*Usnea*), and lobelias are common in the vicinity of the camp. Apart from the rocky outcrops, most of the mountain side in the vicinity was clothed in tufty grass studded with various species of everlasting flowers (*Helichrysum*).

The only mammals seen were mountain duiker and a single hyrax (*Heterohyrax s. kempi*) at 12,000 feet. The porters caught two rats (*Rhabdomys p. diminutus* and *Otomys t. elgonis*) while gathering fuel. Topotypes of the hillchat (*Pinarochroa sordida rudolphi*) and finch (*Poliospiza striolata ugandae*) were collected besides which the only other bird shot was a migrant harrier (*Circus macrourus*). Mention has been made under the last camp of the only reptiles collected, and frog seen, at this altitude.

Bulambuli, Eastern Province. 1°10' N., 34°25' E. Alt. 8,955 feet.

Bulambuli is the site of another Government rest camp on the trail from Madangi to Butandiga. It is situated in the bamboo (*Arundinaria alpina*) zone. Here we halted for lunch and to give the porters a well-earned rest.

A chameleon (*C. b. höhnelii*) was the only reptile collected during our brief halt on January 4, 1934. I searched the bamboos for frogs but with negative results. The bamboos were very slender compared with those in the Uluguru Mountains which harbour such interesting types as *Nectophrynoides tornieri* and *Hoplophryne uluguruensis*.

Butandiga, Eastern Province. 1°12.5' N., 34°22' E. Alt. 7,009 feet.

Butandiga, in Bugishu district, is the site of a well-known rest camp on the trail up western Elgon to Jackson's Summit. The altitude given is that of the rest camp; though our tents were pitched behind and about a hundred feet below, in a little valley where they would be more sheltered.

Camped from January 4 to 17, 1934.

No rain except for a heavy shower one night. The days were relatively hot. The forest has all been destroyed by the industrious Bagishu, who are now cultivating coffee extensively.

The fauna round about proved uninteresting, and, to a great extent, duplicated that of Sipi though eight of the twenty-seven species of mammals taken at Butandiga were not collected at Sipi. Three of the five species of frogs proved to be forms with forest associations, including *Rana f. chapini*, and the huge *R. o. gribinguiensis* now recorded from Uganda for the first time. On the other hand none of the lizards and only one of seven species of snakes (*Thrasops j. jacksoni*) were forest species.

An unfortunate misunderstanding militated against better coöperation of the local natives. When the chief's runner descended from ridge camp to summon porters to take me to Butandiga, I told him to inform the chief at Butandiga that I should arrive on January 5, and for a fortnight thereafter would be glad to purchase reptiles and rodents. In particular I wanted hyrax. For this creature I employed the Swahili name of *pimbi*, adding by way of explanation, "you know, the little animal that has no tail and lives among the rocks." Shortly after my arrival at Butandiga, a man came into camp with four different species of shrew and rodent from each of which he had amputated the tail. In explanation he said that he had been told that I wanted animals without tails! On the 8th a party arrived bearing four huge clay cooking pots with which they had toiled up some distance from below. The pots were crammed full with many hundreds of rats and mice which were in all stages of decomposition and smelling abominably. I felt very sorry for the poor fellows who had doubtless been calculating their wealth at 5 cents (of a shilling) per rat, which was the standard price I paid. As it was I gave them a consolative which I would gladly have increased, but for the injurious effect it might have if the news spread that I was buying rats in such a condition.

Undoubtedly these people were rather stupid from a European standpoint, but I was careful to show no amusement. Unfortunately

my skimmers, gunbearer, and others who had gathered round, began to jeer until called to order. The men departed disappointed; later I learned that on returning home they engaged in an altercation with their chief who was so roughly handled that he was admitted to hospital. The incident is cited as it was the first of its kind in my experience, and serves to emphasize the necessity for exercising care in the sending of verbal messages which are liable to be misunderstood and have unfortunate repercussions.

Lukungu, Eastern Province.

On January 8, some natives arrived in my camp at Butandiga with chameleons (*C. senegalensis* and *C. g. gracilis*). As these are not montane species I enquired from the men as to where they had come from. They answered that they had come up from Lukungu further down the mountain. I have, however, failed to locate any such village on the Uganda Survey map M 54 though the place is undoubtedly in Bugishu district.

Bulanganya, Eastern Province. 1°12' N., 34°22.5' E. Alt. 6,084 feet.

Bulanganya is directly northeast of Butandiga in the adjacent valley down which the Simu River flows.

On January 12, 1934, I spent the day collecting along the river and in the neighbouring banana plantations, returning to the camp at Butandiga in the evening. The upper part of the valley is still well forested. Apart, however, from *Lacerta jacksoni* and *Rana f. chapini* which have forest associations, the lower vertebrates were of savanna types. A good many insects and mollusks were collected.

Budadiri, Eastern Province. 1°9.5' N., 34°20.5' E. Alt. 4,000 feet.

Budadiri, with its beautiful and commodious rest camp, is at the terminus of the road from Mbale. From it a broad and grassy path ascends to within 600 feet of Butandiga. Porters for the climb to the Summit are engaged here.

On January 17, 1934, we arrived at 8.50 A.M. to meet a lorry which was due at 10 A.M. to take us to Bukori. As it was two and a half hours late, we employed the time in buying snails and frogs from the children.

KENYA COLONY

Bukori, Nyanza Province. 0°48' N., 34°40' E. Alt. circa 6,000 feet.

Bukori is a gathering place where the Kitosh natives come to market their produce. It is on the motor road which skirts southern Elgon, from Mbale in Uganda to Kitale in Kenya Colony.

Camped from January 17 to 19, and again for night of February 6, 1934.

When I found the amphibian collecting at Butandiga disappointing, it occurred to me that Kirui's, where Robin Kemp collected in 1909, being type locality for a number of mammals of undoubtedly forest types, might be productive of the amphibians of which we were in search. With nothing but the name "Kirui's" to guide us, for nobody appeared to have heard of it, we set off from Budadiri shortly after noon and drove without breaking our fast until 8 P.M. Some distance off the road we could see the fitful flicker of firelight, evidently in a hut. Stumbling towards it in the darkness, I found the hut so well surrounded by a *boma* of thorn bush that I could not come near it. In answer to my shouts, however, a native opened the door and told me that I was indeed in the former chieftainship of Kirui. As the chief had died some years ago the name had fallen into disuse and he was surprised that I knew it. Next day I met two of Kirui's sons.

On awaking next morning, we found ourselves in a dusty, arid upland where thorn bush mingled with other types of scrub, and baobab trees formed an important feature in the landscape. Towards Mount Elgon, the undulating foothills, heavily stocked with cattle, are burnt over annually and in consequence exhibit gullying and other serious effects of erosion. The changes which this area appears to have undergone have been alluded to in the introduction of this paper.

Kemp, as I recollected from his itinerary (1911, pp. 92-98), had camped in a cave on the southern face of Mount Elgon at about 7,000 feet, later moving to a camp which he called Elgonyi at 9,000 or 10,000 feet. I decided to camp between these two locations. As soon, therefore, as porters could be obtained, we climbed the escarpment, passed Kemp's cave, and pitched our tents in the forest above. Specimens obtained around and below Kemp's cave, in what was formerly Kirui's chieftainship, were labeled 'Kirui', while those taken on excursions in, or adjacent to, the forest above our camp were labeled 'Elgonyi'.

Kirui, s. face of Mount Elgon, Nyanza Province. Alt. 6,000–7,000 feet.

The name Kirui's, though no longer in use for this chieftainship since the death of Kirui, was used on my labels as the specimens are from precisely the same area as was made famous to mammalogists by Robin Kemp's work in 1909–1910. This locality figured largely on the 460 skins which he preserved during his five months' expedition. To make doubly certain that I had the correct location, photographs of the cave in which the natives said he had lived were submitted to Mr. Kemp, who kindly wrote confirming and corroborating their statement. The older natives remembered his visit, and we met the El Kony (Masai) family who occupied the huts in the cave immediately after his departure.

Camped from January 19 to February 6, 1936, above, and beyond, Kemp's cave beside the stream just above the falls.

No rain. Conditions in the forest very dry and, during the second week, grass fires burned on the hillsides adjacent to the forest. A goatherd and his flock and several other natives were said to have perished in these grass fires on Elgon about this time. For further description of this region see the Introduction, and also remarks under the last and next camp.

Topotypic material of the following mammals described from Kirui's was collected: *Crocidura b. elgonius*, *Galago s. albipes*, *Tachyoryctes ruddi*, *Dendromus acraeus*, *Leggada t. triton*, *Choeromys gregorianus*. We failed to get eight other species described from here, though most of them had been secured already at our camps on the western slopes of the mountain. In all, thirty-seven species of mammals were obtained during our short stay here, exclusive of those accredited to Elgonyi during the same period.

Not one of the six species of reptiles taken at Kirui's could be considered a rain-forest form. Of the three amphibians, however, *Rana m. venusta* has distinct forest associations while the leaf frog, *Hyperolius rossii*, recovered from the stomach of one of the *venusta* frogs, may possibly have. The scarcity of amphibian life was eloquent testimony to the disheartening prevalence of the drought.

The Kitosh came up from below with a certain amount of material, they were friendly and helpful and would doubtless have done more collecting had we been camped in a more accessible spot.

Elgonyi, s. face of Mount Elgon, Nyanza Province. Alt. 7,000–8,000 feet.

It is unfortunate that so important a mountain, known to the native tribes inhabiting it as Masaba, should, through a misunderstanding, have received the name of Elgon after one of the most insignificant groups, the Elgonyi or El Kony, dwelling on its southeast slopes. In view of the fact that there are no villages and only a few scattered huts in the largely-uninhabited area where we camped, it seemed advisable to continue to employ the same name as was used by Kemp for this region. Elgonyi was used, therefore, for labeling material actually taken in the forest or on the encroaching grasslands which abut upon it.

Camped from January 19 to February 6, 1936, near the stream in the forest.

For climatic conditions and other remarks see descriptions of the last two camps.

Topotypic material of the monkeys described as *Cercopithecus l. elgonis* Lönnberg and *Colobus a. elgonis* Granvik, both regarded as synonyms of other species, were shot in the forest. What were practically topotypes (Kemp collected up to 9,000 feet) of *Claviglis saturatus*, *Thamnomys s. insignis* (syn. of *T. s. elgonis*), *Cricetomys g. elgonis*, were taken, and topotypes of *Heterohyrax s. kempi*, *Procavia h. daemon* and its synonym *P. daemon varians* which Granvik described from 7,000 feet. In all, twenty-two species of mammals were taken at this camp.

Topotypes were shot of the strange-looking barbet, *Gymnobucco b. cinereiceps*, with brush-like tufts at the base of the culmen, as well as the shrike, *Laniarius l. castaneiceps*, and a series of the swallows, *Hirundo a. arcticincta*, described from these caves.

A good topotypic representation of the scarlet-headed rock lizard, *Agama a. elgonis*, were secured, but other reptiles were rare, and but one, *Lacerta jacksoni*, of the seven species taken was a forest form. We failed to find any frogs even along the stream, in fact the only amphibian taken was a toad, *Bufo r. regularis*, encountered in the forest.

Some children, urged by the headman, brought in quantities of mollusks, but the adult El Kony Masai did not assist us any better than they did Kemp.

Kaimosi, Nyanza Province. 1°45' S., 34°40' E. Alt. 5,300 feet.

Camped in a clearing in the remnant of rain forest on the property of the Friends Africa Mission. Our camp site was about a hundred yards from that occupied by Mr. H. J. Allen Turner, and about three hundred from the spot where Edmund Heller camped when he made his magnificent collection of mammals.

Camped from February 7 to March 11, 1934.

Kaimosi is in the region of the heaviest rainfall in Kenya, averaging 74.16 inches per annum during the last twenty years. It was for this reason removed to Kaimosi when the prolonged drought on Mount Elgon defeated our efforts to find the types of amphibia of which we were in search. On arrival at Kaimosi, however, Mr. F. N. Hoyt informed me that Kaimosi was also suffering from the widespread drought condition and that the millpond was lower than at any time during the 32 years since the mission was opened. On February 12 the longed-for rain arrived though the shower was relatively light. During the remainder of our stay, however, further showers fell on 9 days giving a total precipitation of 2.86 inches in 31 days. It proved sufficient to cause the frogs to emerge from their retreats and assemble in hundreds at the millpond.

In the last thirty years, much of the country around Kaimosi has undergone deforestation as a result of the immigration and settlement of large numbers of natives. Rides were even then being extensively cut in the neighbouring Kakamega forest to provide pit props for the mining operations in the vicinity. This magnificent forest, together with the Yala River and its tributary the Lukosa River, are zoologically very important as constituting the eastern limits of the range of many West African sylvicoline vertebrates. Series of topotypes of ten of these mammals were secured and a new one (*Nycteris nana tristis* Allen & Lawrence) added. Perhaps the most interesting point brought out was that of the essential unity of the faunae in the now separated Kakamega and Elgon forests. No fewer than 38 of the 48 species of mammals collected during our month at Kaimosi were previously taken by us on Mount Elgon or at its foot.

The local tribes, Wateriki and Maragoli, among whom the Mission is doing splendid work, were most friendly and coöperated so well in bringing in specimens that we felt we had secured a really representative collection of both mammals and reptiles during our relatively short sojourn among them.

Molo, Naivasha Province. 0°15' S., 35°45' E. Alt. 9,000 feet.

Molo is a station on the Kenya-Uganda Railway lying between Londiani and Nakuru stations.

Our lorry arrived after dark on the night of March 12 and we left early on March 13, 1934. Spent the night at the very comfortable Highland Hotel.

Molo is type locality for *Phrynobatrachus wittei* Angel, so I set out with a torch in search of some and was successful in capturing three adults. These show that the species should be called *Rana wittei* (Angel). In addition several *Phrynobatrachus keniensis* were secured; both species have a similar distribution in the Kenya-Aberdare highlands.

Kikuyu, Ukamba Province. 1°15' S., 36°40' E. Alt. 6,695 feet.

Kikuyu is a station on the Kenya-Uganda Railway lying between Naivasha and Nairobi stations.

Our lorry arrived after dark on the night of March 13 and left early on March 14, 1934. We stayed with Dr. and Mrs. J. W. Arthur at the Church of Scotland Mission.

In swampy pasture land on the mission property several species of frogs were captured by Mrs. Loveridge. They included both *Phrynobatrachus keniensis* and *P. kinangopensis* which occur together.

Nairobi, Ukamba Province. 1°17' S., 36°50' E. Alt. 5,452 feet.

Nairobi, the capital of Kenya Colony, is 260 miles southwest of Kisumu and 327 miles inland from Mombasa.

Arrived early on March 14 and left on March 20, 1934.

My time was chiefly occupied with making arrangements for the second part of the trip. One evening, however, was spent on the Athi Plains southwest of the station, just outside the town, in search of *Hyperolius symmetricus*, *platyrhinus*, *pictus* (part), *asper*, *ferniquei* and *coerulopunctatus* for all of which this is the type locality. As a result of studying the series of topotypes which we secured, I came to the conclusion that all are referable to either *undulatus* (Boulenger) or *striolatus* Peters.

Kibwezi, Ukamba Province. 2°23' S., 37°55' E. Alt. 2,985 feet.

Kibwezi is a station on the Kenya-Uganda Railway lying about midway between Magadi Junction and Tsavo station. My tent was pitched beneath a big tree just east of, and only a hundred yards from, the station.

Camped from March 22 to March 30, 1934.

No rain; heat very trying.

Kibwezi might be said to have become known to zoölogists as a result of the activities of two German planters—Huebner and Scheffler. One of their finds, a gecko of the genus *Lygodactylus*, was described as a race of *fischeri* of the West African forests. This led me to suppose that there might be a remnant of virgin forests at Kibwezi. Accordingly, I enquired of Mr. C. W. Hobley, who replied: "There is a relic of rain forest there, for the original stream was over part of its course covered by a fairly recent lava flow and it springs out in all sorts of odd places and then disappears again under the lava. Where it oozes out, patches of fine forest occur. It is a good place for snakes."

Many of the fine trees are only enormous acacias, however, and the patches of forest would probably be classed as gallery forest. The lava, which covers much of the country like a blanket, is overgrown with creepers and scrub. The creepers often conceal deep fissures. In such a type of terrain collecting is exceedingly difficult for snakes and lizards can retire into crevices where they are secure from molestation; while birds, if shot, are often impossible to recover. To the east and south lies the laterite country which, as savanna or desert, and supporting its rather representative fauna, stretches away to Voi and beyond.

Much of the material sent to Berlin by Huebner and Scheffler, was described as new, though recently many of these names have been reduced to synonymy. Kibwezi thus became type locality for *Lycan huebneri*, *Procavia scheffleri*, *Glaucidium c. scheffleri*, *Parisoma p. orientale*, *Cyanomitra o. neglecta*, *Coronella scheffleri*, *Micrelaps bicoloratus*, *Lygodactylus f. scheffleri*, *Mabuya diesneri*, *Chiromantis pygmaeus*, *Hyperolius scheffleri* and partly for *H. coeruleopunctatus* and *H. ujijensis*. Of these I was only successful in securing topotypes of a snake, lizard and two frogs.

Tsavo, Coast Province. 3°0' S., 38°29' E. Alt. 1,525 feet.

Tsavo is a station on the Kenya-Uganda Railway where the latter crosses the Tsavo River, due north of Voi station. I occupied a vacant and semi-ruinous house two hundred yards east of the station.

Remained from March 30 to April 6, 1934.

No rain. Heat so withering as to render collecting between 9 A.M. and 4 P.M. futile and out of the question. The local natives said that no rain had fallen for a year.

No Europeans live at Tsavo, the station being maintained to water the engines by tanks filled from the Tsavo River. Tsavo consists of a group of huts occupied by the railway staff and their families, the men operating the tanks and keeping the permanent way in repair. Around this desolate little outpost lies the desert-like, eroded country which manages to support dense thickets of thorn bush and quite a little game. The desiccated conditions resulting from the long-delayed arrival of rain, naturally militated against collecting, for most amphibians and many species of reptiles were aestivating. A few miles distant from the station are numerous rocky kopjes which form quite a feature of the landscape.

Tsavo, or the Taru desert, is type locality for nearly a dozen races of birds but only one reptile, *Lygosoma gromicri* Angel. I concentrated on hunting for this skink but only obtained *Riopa m. modestum*. On the spot one wishes that the type locality was a little more explicit; confronted by a landscape stretching to hills or the horizon in every direction, one wonders if the skink was taken along the river or on some distant kopje.

As Tsavo is herpetologically practically unknown, a list of the species obtained during the week which I spent there will give a good picture of the herpetofauna. The species collected were: *P. sinuatus*, *C. s. fuscorosca*, *P. biserialatus*, *M. bicoloratus*, *D. angusticeps*, *H. brookii*, *A. a. lionotus*, *L. l. revoili*, *M. brevicollis*, *M. q. obsti*, *R. m. modestum*, *Rana o. oxyrhynchus*, *P. natalensis* and *P. acridoides*. The three species of frogs were all taken in a runnel of water which was used to irrigate the station gardens.

Voi, Coast Province. 3°23' S., 38°35' E. Alt. 1,833 feet.

Voi is an important administrative centre and station on the railway 104 miles northeast of Mombasa. Thanks to the kindness of Mr. A. B. C. Smith I was permitted to occupy the vacant house on Msinga Estate, about five miles east of Voi station and conveniently situated close to gallery forest.

Arrived after dark on April 6 and remained till early on April 13, 1934.

No rain except for a heavy downpour on the day of arrival.

At the time of my visit, the Voi River was represented by a broad sandy bed. Along much of its course this was flanked by very dry gallery forest composed of magnificent trees interspersed with acacia. Most of my hunting was done in this forest while the river bed supplied a highway by which one could get about, much of the country being impassable at this season on account of the rank growth of grass.

Topotypes of *Dipodillus percivali* (a synonym of *pusillus*), *Acomys i. ignitus*, *Francolinus h. hildebrandti*, *Agama r. septentrionalis* and *Geocalanus acutus* were collected. Actually it was on account of the latter that I made a stay at Voi for this strange amphisbaenid has not been collected since the types were described more than twenty years ago. It does not appear to have any present association with forest for most of the sixteen examples taken were found in sandy soil on the flats of the Msinga Plantation, though near to the Voi River.

In all, 13 species of mammals, 21 of birds, 31 of reptiles, and 2 of amphibia (testimony to the drought), were taken during the week. From this evidence it may be stated that the Voi fauna is essentially that of the coastal belt with an admixture of northern thorn-bush steppe forms. The only rain-forest species is represented by three examples of *Siaphos kilimensis* which escaped remark in my notes; possibly overlooked with *Riopa m. modestum* to which they bear a superficial resemblance, or else mislabeled on Mount Mbololo where *kilimensis* is common. *Lygodactylus scheffleri* was taken in the gallery forest along the Voi River where *L. p. picturatus* and *L. p. mombasicus* meet.

Mount Mbololo, Coast Province. $3^{\circ}15' \text{ S.}$, $38^{\circ}25' \text{ E.}$ Alt. 4,800 feet.

Mount Mbololo is in the Teita Mountains about ten miles from Voi. Unfortunately, in view of the fact that Teita is the accepted Government spelling, I followed Peters and Gregory in spelling it Taita both on my labels and in this series of reports. Camp was pitched at the edge of the remnant of forest capping the summit, after nine days I descended to about 3,800 feet where I remained for a week awaiting news of the breaking of the rains at the coast.

Camped on summit from April 13 until April 23, then halfway down the mountain from April 23 until April 30, 1934.

No rain, but at the upper camp such a heavy nocturnal condensation occurred as to leave the trees dripping for hours. The blanket of fog, which began to gather about dusk, enveloped the summit until 8 or 9 A.M. Drought conditions prevailed at the lower camp.

It is most important that the difference in location of these two camps should be borne in mind for the forest fauna at the summit was totally different from the encroaching fauna in the eroded area of rock and scrub at 3,800 feet. The fauna of the latter was essentially that of Voi, in fact 17 of the 32 species of reptiles taken on the mountain were common to Voi.

Whether the new skinks described as *Acontias percivali* from the foot of the mountain are survivors from a former forested area is not clear. In the forest four white-eyes proved to be new (*Zosterops silvanus*), their nearest relative, *Z. winifredae*, having been described from the Usambara Mountains, with whose fauna that of Mount Mbololo forest shows distinct affinities.

Forms associated with the rain forest of the mountain top were: *Cnemaspis a. africanus*, *Lacerta jacksoni*, *Siaphos kilimensis*, *Chamaeleon f. tivetensis*, *Boulengerula taitanus* (type series), *Rana f. chapini* and *Arthroleptis adolfriederici*.

Topotypes were collected of *Lasiopygia a. kima* (synonym of *C. m. kibonotensis*), *Petrodromus s. sangi*, *Epimys taitae*, *Pelomys f. iridescens*, *Turacus hartlaubi crissalis* (invalid), *Turdus o. helleri*, *Pogonocichla m. helleri*, *Mabuya q. hildebrandtii* (synonym of *M. q. obsti*), *M. planifrons* as well as its synonym *M. taitana*. Whether either of the species of *Hyperolius* collected will later prove to be referable to *H. glandicolor* and *H. striolatus*, which were described from Teita by Peters, remains to be seen.

Malindi, Coastal Province. 3°13' S., 40°8' E. Alt. 70 feet.

The historical old port of Malindi lies 78 miles by road north of Mombasa. Collecting was done on both outward and return journeys.

On the outward journey Malindi was reached after dark at 7 P.M., May 1. I spent the night at the comfortable Palm Beach Hotel which is practically on the shore of the sandy bay to the north of the town. Various insects, including a couple of hawk moths (*Euchloron m. megaera*) were taken at light. After breakfasting at 6.30, I left at 7 A.M. the following morning.

On the return journey Malindi was reached on June 28, collecting was carried out till late on Saturday night, June 30. We left in torrential rain on July 2. Camp was pitched close to the shore about a furlong south of Palm Beach Hotel on a site which has since been built over.

According to FitzGerald (1898) the average rainfall is 45" per annum. I was told however, that during May and June of this year (1934) the fall had equalled the average precipitation for the half year of January to June. Except on Saturday, frequent and heavy downpours occurred daily during our stay.

Swamps had formed close to our camp. By wading in these at night, and aided by a torch, I secured thirteen species of frogs and toads in three evenings.

Malindi being type locality for *Anthus melindae* and *Urobrachya a. zanzibarica*, considerable time was spent in unsuccessfully hunting for these birds. The weaver had been seen on the march from Golbanti to Malindi only a few miles north of the town. During our brief stay, we failed to run across *Zamenis fischeri* (= *Coronella s. semiornata*) described from here by Peters, though we took eight other species of snakes and eight of lizards. Among the latter were topotypes of *Ablepharus b. africanus* Sternfeld, which occur on the coral rag at the south end of the bay.

The assistance rendered by the Giriama and Swahili was negligible, for they had scarcely time to become aware of our requirements before we were on our way again. The Giriama are probably very helpful in bringing in material.

Golbanti, Coastal Province. 2°27' S., 40°7' E. Alt. 500 feet.

Golbanti, formerly called Burabin (or Borabin) from the lake of that name in its vicinity, is a village lying in a bend of the Tana River where there is a pontoon ferry.

Stayed in the Rest House on May 2 on the outward journey, and over the week end from June 21 to 25, 1934, on the return trip.

On May 2 we reached the village at 4 P.M. when I broke a 9½ hours fast occasioned by the difficulties of the road from Malindi resulting from the few heavy downpours which inaugurated the breaking of the rains. The lorry was bogged for as long as two hours in one spot. The high humidity accompanying a temperature of about 90°, the swarming flies and hordes of mosquitoes gave a very unfavourable impression. We loaded up and left early next morning but there were most vexatious delays at the ferry where the truck had to be unloaded again and the loads carried through tenacious mud and down a treacherous slope.

Conditions were pleasanter on my return visit when I arrived by canoe. Two months of incessant rain had done much to reduce the temperature.

The seven species of mammals preserved were common coast-forms. Only three birds were shot, viz. *Pelecanus rufescens*, *Franco-linus s. granti* and *Pternistes a. leucoparaceus*, the latter almost typical of a race that is rare in collections. Though not uncommon, these bush fowl were very wary and difficult to shoot.

Some 200 specimens of amphibia, representing 13 species, were collected in two days; these included paratypes of two new species of sedge frog, viz. *Hyperolius ahli* and *H. milnei*. Of reptiles 15 species were taken, all referable to common and widely distributed forms except for a snake, *Coronella coronata*, and paratypes of the recently described skink *Riopa tanae*.

The Pokomo villagers, though pleasant and friendly, appeared disinclined to aid in collecting. The women, and a few of the men, were very busy in their rice fields which surrounded the numerous swamps. In general the men appeared indolent, probably they are heavily parasitised, particularly with malaria. The children brought in many frogs, but did not collect intelligently; doubtless they might have been trained had my stay been longer.

Witu, Coast Province, 2°21' S., 40°30' E. Alt. circa 300 feet.

Witu, formerly the headquarters of an Arab Sultanate, is still a township of some importance situated southeast of Lamu Island.

Spent the night of May 3 in a swamp near Witu, while on the return journey I was the guest of Mr. R. D. Milne from May 31 to June 4, 1934.

Heavy downpours were frequent and had turned much of the countryside into swamps and lakes.

After leaving Golbanti at 7.30 A.M. on May 3, it took our lorry twelve strenuous hours to cover twenty miles of black cotton soil in the Tana delta. The delay was due to our being mired up to the differential four times, each occasion necessitating the entire removal, portage, and repacking of the loads on the truck. Finally, at 7.30 P.M., fortunately in moonlight, we sank up to the axles in a shining sheet of water which concealed the treacherous mud. Round us frogs of many species chorused, and among the medley of cries I noted an unfamiliar, musical call which I rightly surmised was that of *Leptopelis concolor* so recently described from Witu by Dr. Ahl. I captured several that night, for we had to remain where we were, two miles from Witu which is 177 miles by road north of Mombasa.

On my return journey I had planned to stay at a village called Mombo Sasa, about five miles north of Witu and adjacent to the forest. The latter is almost rain forest, certainly much wetter than most of the patches of coastal forest. On arrival at Mombo Sasa in a deluge of rain that had scarcely abated all morning, I was met by Mr. R. D. Milne, who graciously insisted on my staying at his plantation. I was nothing loath, having just walked nineteen miles of which eight, according to my diary, were through water which made one's knees ache. In several places on the road it had been knee deep for long stretches and over one stretch it was up to my waist. Unfortunately I had already written Mombo Sasa on my labels. As, however, the plantation is slightly nearer the better known Witu than it is to Mombo Sasa, I have treated all material from this area as from Witu.

Even in the forest the soil is very sandy and consequently admirably suitable to the growth of palmyra (*Borassus flabellifer*) and doom palms (*Hyphaene thebaica*) which constitute such an important part of the flora. The torrential rains had formed extensive pools in suitable depressions, and it was in one of these that I encountered large numbers of a small green frog (*Hyperolius milnei*) for the first time. A rare sphingid (*Likoma crenata*) was also collected at Witu.

Lamu Island, Coast Province. 2°16' S., 40°54' E. Alt. 30 to 250 feet.

Camp was pitched under the mango trees on the site of the abandoned wireless station half-a-mile south of Lamu township.

Camped from May 5 to 15, 1934.

Heavy rain, amounting to 11.83 inches, fell during my stay: only two days were wholly fine, but the greatest downpours occurred during the night. I am indebted to C. E. Whitton, Esq., long resident on the island, for the rainfall statistics covering a period of twenty-seven years (1907-1933). They vary from 16.51 to 48.46 inches with an average of 30.44 inches per annum. May averages 16.39 inches and is usually the wettest month in the year, so that the time selected for my brief visit was most propitious. June to August constitutes the coolest season of the year with a minimum temperature of about 63°.

The island is nine miles long and six broad at the widest part. Not far southeast of my camp the sand dunes rose to a height of 150 feet. Most of the interior of the island, however, is a fairly level sandy plain which is given over to the cultivation of coconuts. Lamu appears to be nothing but a gigantic sandbar on a raised coral reef, without any rock or soil other than that which has been brought to it by human agency. Under these conditions nothing approaching forest occurs on the island.

Two mammals, a baboon (*Papio ibeanus*) and mongoose (*Helogale vetula*), described as from Lamu by Oldfield Thomas (1911), do not occur on the island though present on Manda Island and the adjacent mainland. At the time of my visit there were three *Helogale vetula* living in captivity in the town, one being offered to me for sale. It seems quite possible, therefore, that the types of the baboon and mongoose were purchased from natives who had brought them from the adjacent mainland. Alternatively 'Lamu' may have been used in the sense of Lamu district, which includes the neighbouring littoral. Lamu is also type locality for a woodpecker (*Campethera n. pallida*) which indeed I saw, but was unable to shoot on account of its wariness.

Three snakes have been described from Lamu, the first of these, *Lycophidion jacksoni* Boulenger, has long been recognized as a synonym of the widespread *L. c. capense*. The other two were not localized when described, but their author (Sternfeld) remedied this the same year (1908) by attributing them to "Lamu Island." One of these *Amphorhynchus taeniatus* I have shown to be a synonym of *Hemirhagerrhis kelleri*, the other *Rhinocalamus meleagris* I believe to be a synonym of *Microlops bicolor*.

Manda Island, Coast Province. 2°16' S., 40°56' E. Alt. 10 feet.

The altitude given is that of my camp at Ras Kitau. The tents were pitched in the open just thirty feet back from the usual tide line.

Camped from May 15 to 20, 1934.

Manda Island had undoubtedly enjoyed the same rainstorms as Lamu in the week prior to our arrival. During our stay there was only one heavy downpour, this occurred on May 18, and lasted several hours. The nights were cloudless, the sky studded with stars. As there are no springs or freshwater wells on the island, our supply was daily brought across from Shella.

Manda lies northeast of Lamu Island from which it is separated by a relatively narrow channel. Unlike Lamu, however, it is composed of coral rag, which is exposed in many spots but in others is covered by a good depth of rich red soil. Today, most of the island is under dense scrub with acacia predominating. Where the growth is recent it is often impenetrable, but game paths are numerous under the taller acacias whose spreading boughs form a canopy overhead. At the time of our visit the more open spaces were clothed in freshly-sprouted grass whose vivid green in contrast with the bright red soil presented a pleasing picture. At the height of the dry season the island is probably arid and uninviting.

Three birds have been described from Manda, viz. *Sylviella w. minima*, *Tschagra j. mandana* and *Lamprocolius c. mandensis*, but we had to conserve our ammunition and had come to the island in search of topotypic material of the little worm snake, *Leptotyphlops boulengeri*, known only from the type secured here by Voeltzkow over thirty years ago. Despite earnest search, several days elapsed before we found one, and, as we had already secured a series on Lamu, we made arrangements for our immediate departure. Topotypes were collected of the little skink, *Ablepharus b. africanus*, which is abundant on the maritime rocks along the shore.

Owing to the absence of water, there are normally no natives resident on the island. Actually at the time of our visit, as a result of pools having been formed by the heavy rains, several families were temporarily living in scattered huts. These were situated in cultivated plots which the owners had come over to guard from the depredations of baboon and buck. They could spare no time for collecting because they lacked the inclination.

Wange, Coast Province. 2°0' S., 40°54' E. Alt. circa 50 feet.

Wange (Wangi) is the site of a plantation formerly owned by the late Gustav Denhardt: it lies on the north shore near the head of Mongoni Creek opposite, yet due north of, Manda Island.

When Herr Denhardt, who lived on Lamu, gave a collection of reptiles to Chanler, Wange became type locality for two species of snakes (*Typhlops mandensis* = *T. s. mucroso*, and *Simocephalus chanleri*, now known as *Mehelya c. chanleri*). Unfortunately in describing them, Stejneger (1893) gave the type locality as Wange, Manda Island, whereas Wange is two days sail from Manda even with the blustering southwest monsoon behind one.

I had planned to visit Wange where a patch of virgin forest, the most northeasterly in Kenya, is said to be surviving. The time factor intervened, however, for I found that though I might get there in two days, I should be fortunate if I could get back to Lamu in ten days of tedious tacking. When I proposed walking back I was told that it was extremely doubtful if porters could be found at Wange willing to undertake the journey at this season of the year when, on account of the flooded state of the country, it might be impossible to get through on foot. Though Wange is only about forty miles from Lamu in a direct line, the route is a tortuous one because of the many detours necessary to skirt the numerous inlets and mangrove swamps. Under the circumstances I had to abandon this part of the itinerary.

Pokomoni, Coast Province. 1°55' S., 40°50' E. Alt. circa 50 feet.

Pokomoni appears to be about ten miles beyond Wange and I had to relinquish my hopes of visiting it for the same reasons given above.

The 39 mm. frog collected at "Pokomonie" by Gustav Denhardt, and described by Ahl as *Chiromantis albescens*, was doubtless taken in the vicinity of Pokomoni Creek which discharges into Mongoni Creek. As this insignificant stream is to be found on few maps, and as Pokomoni, literally 'the place of the Pokomo people', might be assumed to be the present location of the tribe along the Tana River where Herr Denhardt also collected, it seems worth drawing attention to its position here.

I have synonymized (1929) *albescens* with *C. p. petersii* on account of its length, but from the position of Pokomoni it seems possible that it might be a two-thirds grown example of the northern race, *C. p. kelleri*, which is only distinguishable by its larger size.

Kililana, Coast Province. 2°12' S., 40°47' E. Alt. *circa* 20 feet.

Kililana was the name of another of Denhardt's plantations long since returned to grass and scrub. I located the foundations of the planter's home which was at the head of a dismal mangrove creek and surrounded by swamps. It lies opposite Lamu Island.

A boat which I had chartered, picked me up on Manda Island and landed me at Kililana at 10 A.M. on May 21, 1934. Left at 1 P.M.

Kililana is type locality of *Hyperolius rubripes* Ahl which I believe to be a synonym of *H. sansibaricus* (Pfeffer). Midday on the equator is not the best time to go frogging and though I spent an hour wading waist deep in a swamp about a mile from the planter's old home site, I only captured a dozen *H. milnei* and failed to secure topotypes. Later I was to get *sansibaricus* at nearby Mkonumbi.

Mkonumbi, Coast Province. 2° 16' S., 40° 42' E. Alt. *circa* 50 feet.

Mkonumbi is at the head of a creek opposite Lamu Island. During my enforced stays there I put up at the Government rest house.

Remained from May 21 to 23, and again from May 28 to 30, 1934.

During most of the year there is a dhow service maintained between Lamu Island and Mkonumbi; though relatively near, the configuration of the coast with its sandbars, mangrove swamps and estuaries often results in a tedious journey so that it was nearly 11 P.M. before I reached the town and its attendant mosquitoes. It is situated in low-lying, often flooded, sandy flats which on the landward side are more or less studded with shrubs and small stunted trees.

Though type locality for *Agama gregorii* Günther, a synonym of *A. atricollis*, I had no intention of staying longer than was necessary to obtain porters. It was indeed fortunate for me that Captain Clive, District Officer of Lamu, was passing through Mkonumbi at the time of my first visit. It is thanks to his kindness that I am not there still! Though the local people were in many instances drawing famine relief, and there were plenty of idlers to be seen in this large town, and though I offered double the usual pay for portage, these Swahili held out for more. On my return from Lake Peccatoni on May 28, I had the greatest difficulty in getting my loads shifted to Witu, and it was only accomplished in instalments lasting over a period of three or four days.

Peccatoni, *Coast Province*. 2°25' S., 40°43' E. Alt. *circa* 100 feet.

Lake Peccatoni, spelt by Boettger (1913) Peccetoni, and shown on some maps as Mpekatoni, is ten miles south of Mkonumbi. Our tents were pitched beneath three great mango trees about a quarter of a mile southeast of the village and a quarter of a mile south of the lake.

Camped from May 23 to 28, 1934.

Torrential rain on all except two days of our brief visit.

This side trip was made to ascertain the conditions under which the caecilian described as *Bdellophis unicolor* by Boettger was surviving, in view of the fact that its known relatives are practically unknown outside of rain forest. As a result of the study of the 130 specimens collected (heretofore *unicolor* has only been known from the type) it was found that *unicolor* is a synonym of *Dermophis gregorii*, a mud-dwelling species.

Peccatoni derives its name from a great tree on the northeast side of the lake. In the days of the Witu Sultanate much of this country was under cultivation by slaves. Evidence of this is to be seen in the clumps of magnificent old mango trees which one encounters unexpectedly in the bush. Doubtless in pre-Arab days much of the region may have been forested with trees of the type occurring in the Witu and Sokoki Forests.

The big saucer-shaped depression occupied by the lake is continued at the south end in a series of swamps. The slightly elevated country surrounding it is well wooded with scattered borassus and doom palms, and grass, either long or short according to the poverty of the soil, clothes the ground beneath. While the elevated ground is of a sandy nature, in the hollows black cotton soil predominates.

At the time of our visit the lake was about two miles long and three-quarters of a mile broad. It waxes and wanes according to the season. The old chief told me that in bygone days it was much more extensive and broke through to the sea at its south end in years of exceptional rain. Hippopotamuses formerly lived in it but have since been shot out. During the dry season it is said to be crowded with waterfowl.

The moribund local natives, descendants of slaves, were disinclined to make any effort to secure caecilians though they admitted their abundance. On the return of their chief with famine rations, they turned to and brought in the whole series at the rate of 30 cents (6c U. S.) per caecilian for the first hundred, 10 cents thereafter.

Kau, Coast Province. 2°28' S., 40°28' E. Alt. circa 100 feet.

Kau is on the banks of the Ozi River where it is connected with the Tana by the Belazoni (*Belezoni, Belesoni, Belzoni*) Canal. Since the cutting of the canal the Ozi has become the main outlet of the Tana River, its own mouth being silted up with sandbars and choked by vegetation during the greater part of the year.

Arrived at noon on June 4, spent night in rest house on river bank, left by canoe on June 5, 1934.

Only ceased raining for about two hours the first day, and was raining when we departed at 7.30 A.M. the following morning.

We had left Witu in pouring rain at 8 A.M. on a trail to Kau, for the path from Witu to Ngatana, partly through forest, was said to be quite impassible. We had proceeded but a short distance when we came to the first of several waist-deep streams which had to be forded. On nearing the Tana delta we found great stretches of country inundated by slowly-flowing water. The broadest of these was about fifty yards across, and for a distance of about fifty feet in its centre I was walking up to my armpits. It was a strange sight to see the straggling line of porters negotiating this stretch, several of the shorter men were up to their necks, one being over his mouth had to be supported through by two others. Still nearer Kau the trail became unbelievably slippery, three men fell with their loads so that their contents were more or less immersed in muddy water. Fortunately the cartridges, though entirely submerged, did not suffer from this treatment as I took steps to have them dried immediately upon arrival. On either side of the path were freshly-made graves of which I counted a dozen. Kau being hemmed in by swamps, the people had nowhere else to bury their dead. As we walked through the village I noted a number of obviously sick natives lying beneath the eaves of their huts. I thought that an epidemic must be raging but was told that they were only suffering from fever. Conditions have not changed since Gregory's visit when his men demanded to leave Kau "as the mosquitoes rendered their lives unbearable." Fortunately Japan has come to the rescue by furnishing a modern amenity in the shape of a cheap mosquito bar with one of which each of my 'boys' was supplied.

The chief gathered the children together and in the short time of about three hours they brought in 48 caecilians as well as 14 examples of an undescribed species of skink (*Riopa tanae*.)

Belazoni, Coast Province. 2°32' S., 40°18' E. Alt. *circa* 150 feet.

Belazoni (Bellazoni, Belezoni, Belesoni, Belzoni, M'Beledzoni) is the site of a plantation in the fork formed by the Belazoni Canal and old Tana River.

Spent the night of June 5, 1934.

Heavy showers occurred during the course of the journey in a dug-out from Kau, and also as the loads were being carried up to the house where Mr. Pettley entertained me. A bat (*Mops osborni*) collected here, proved to be the first record of the occurrence of this Congo species on the coast.

Laini, Coast Province. 2°30' S., 40°12' E. Alt. *circa* 200 feet.

A small Pokomo village on the south bank of the Tana River.

Spent the night of June 6, 1934.

Infrequent downpours occurred during the day.

Just before sunset I collected a couple of snakes; after dark, aided by an electric torch, hunted amphibia in the rice swamps.

Ngao, Coast Province. 2°24' S., 40°8' E. Alt. *circa* 250 feet.

Site of a large village and a German Mission station where I was hospitably entertained for the night.

Spent the night of June 7, 1934.

It took our heavily laden canoe 12 hours to negotiate the swift currents of the flooded Tana between Laini and Ngao. It was long after dark when I arrived and broke a 13-hour fast.

Garsen, Coast Province. 2°17' S., 40°1' E. Alt. *circa* 275 feet.

The position given is only approximate as this relatively new village by the Garsen Ferry, which is under construction, is not on available maps.

Spent the night of June 8, 1934.

I marched from Ngao, after crossing the Tana by boat, while the dugouts negotiated the tortuous bends of the river. I went out collecting in the late afternoon but got little. The Pokomo at this village were unfriendly and unhelpful, in marked contrast to those at Ngatana from whom I parted with real regret.

Wema, Ngatana, Coast Province. 2°14' S., 40°1' E. Alt. *circa* 300 feet.

Camped beneath a large tree about 200 yards north of the new village of Wema, and about 70 yards east of the Tana River.

Camped from June 9 to 21, 1934.

Heavy rainstorms swept across the country from time to time but the intervals between them increased so that we had several entirely fine days.

Ngatana was made known to zoölogists through the collections made there in January, 1893, by that intrepid geologist, the late Professor J. W. Gregory. I had some difficulty in locating the place for the old village of Ngatana had been abandoned as a result of some epidemic. The site is marked by an extensive grove of fine old mango trees beneath which are three or four huts. I was informed that as a result of the many deaths occurring among the Wapokomo in these parts, the Medical Officer of Heath had recently ordered the abandonment of many scattered settlements in the vicinity. The population were then concentrated in a new village on a specially selected site; this village they had named Wema.

On arrival, I at first endeavoured to differentiate my material as between the old type locality of Ngatana, and the new village of Wema which is about a mile away. Both are situated in an area, or district, vaguely referred to as Ngatana (Engatana on some maps). When, however, the natives began bringing in specimens from intermediate points and the country round about, I was forced to abandon any distinction and thereafter labeled everything Ngatana.

Surrounded by swamps, teeming with mosquitoes, it was little wonder that one after another Gregory's men died, four of my five native assistants went down with fever during our stay here. For a detailed description and pictures of Ngatana, I cannot do better than refer the reader to Gregory's book, "The Great Rift Valley."

As references have been made already to the peculiarities of the Tana fauna, it is only necessary to mention here that Ngatana was included in the itinerary because it was type locality of a gecko, *Bunocnemis modestus*, and caecilian, *Dermophis gregorii*, known only from the types though Gregory discovered them over fifty years ago. We were fortunate in capturing topotypes of both as well as a series of a new skink, *Riopa mabuiiformis*, on the site of old Ngatana.

Karawa Camp, Coast Province. 2°35' S., 40°8' E. Alt. circa 100 feet.

Karawa (Kurawa, Krawa) is a recognized camping place just north of Lake Karawa in the uninhabited stretch of country south of the Tana River. Camped beneath a group of baobabs.

Camped for the afternoon and night of June 25, 1934.

No rain on the 25th., though the long grass soon soaked us nearly to the waist. On leaving Karawa next morning we had to wade through a chest-high swamp at the very start. Though only a light shower occurred, the march to Marareni was a grueling one of about six hours. I saw Peter's gazelles, oryx, dikdik and countless hundreds of pelicans, wood ibis, and other aquatic birds. The porters, an hour behind me, saw an elephant which stopped and looked at them before making off.

Marareni Camp, Coast Province. 2°50' S., 40°10' E. Alt. 70 feet.

Marareni (Marereni) is another camping ground on the site of an abandoned village.

Camped for the afternoon and night of June 26, 1934.

The march from Marareni surpassed in misery all others of the whole trip. I had risen as usual at 3.45, and we left as soon as it was light at 5.30 a.m. The route lay across swampy flats and salt marshes under very exposed conditions where we were lashed by torrents of driving rain. One such downpour lasted without cessation from 9 till 10.30 a.m. At one point it was necessary to wade through knee-deep, foul-smelling, black mud in a mangrove swamp. The only alternative an extensive detour inland for which we were too weary.

Gongoni, Coast Province. 3°5' S., 40°10' E. Alt. 70 feet.

Gongoni, right on the coast, is an important salt-distilling centre. Through the courtesy of the owners, I was allowed to pitch my tent in the centre of their employees' village — about the only cleared and level ground to be found in the vicinity, and conveniently near to a hut in which my cook was able to light a fire without having it extinguished by one of the frequent rainstorms.

Camped for the afternoon and night of June 27, 1934.

Spent an hour or more hunting for blind snakes in the cultivated patches about the European's house. Interesting earthworms (*Polytoreutus multiporus*) were among the things obtained here.

Mombasa, Coast Province. 4°3' S., 39°40' E. Alt. 70 feet.

The well-known port of entry and departure for Kenya Colony.

Stayed at the Manor Hotel from July 2 to 9, 1934.

While awaiting the arrival of the overdue S. S. Durham Castle, I put in a couple of days collecting on the mainland opposite Kilindini Harbour and at nearby Changamwe.

BIBLIOGRAPHY

BARBOUR, T. and LOVERIDGE, A.

1928. "A Comparative Study of the Herpetological Fauna of the Uluguru and Usambara Mountains, Tanganyika Territory, with Descriptions of new Species." *Mem. Mus. Comp. Zoöl.*, **50**, pp. 87-265, pls. i-iv.

BUXTON, D. R.

1937. "A Natural History of the Turkana Fauna." *Journ. E. A. & Uganda Nat. Hist. Soc.*, **13**, pp. 85-104, pls. A-H and i-iii.

CHAMPION, A. M.

1933. "Soil Erosion in Africa." *Geog. Journ.*, **82**, pp. 130-139.

FITZGERALD, W. W. A.

1898. "Travels in the Coastlands of British East Africa and the Islands of Zanzibar and Pemba." London. 8vo.

HANCOCK, G. L. R. and SOUNDY, W. W.

1929. "Notes on the Fauna and Flora of Northern Bugishu and Masaba (Elgon)." *Journ. E. A. & Uganda Nat. Hist. Soc.*, No. 36, pp. 165-183, pls. i-vi.

HOBLEY, C. W.

1933. "Soil Erosion: A Problem in Human Geography." *Geog. Journ.*, **82**, pp. 139-150, pl. —

JOHNSTON, SIR HARRY

1902. "The Uganda Protectorate." **1** and **2**. London. 4vo.

KEMP, ROBIN

1911. "On the smaller Fauna of Mt. Elgon." *Journ. E. A. & Uganda Nat. Hist. Soc.*, No. 2, pp. 92-98.

LÖNNBERG, EINAR

1922. "Sammlungen der Schwedischen Elgon-Expedition im Jahre 1920. 6. Reptiles." *Arkiv Zool.*, **14**, No. 12, pp. 1-8.

LOVERIDGE, ARTHUR

1933. "Reports on the Scientific Results of an Expedition to the South-western Highlands of Tanganyika Territory. I. Introduction and Zoögeography." *Bull. Mus. Comp. Zoöl.*, **75**, pp. 1-43, pls. i-iii.

LUGARD, E. J.

1933. "The Flora of Mount Elgon." *Roy. Bot. Gardens, Kew Bull. Misc. Inform.*, pp. 49-106.

MOREAU, R. E.

- 1933 "Pleistocene Climatic Changes and the Distribution of Life in East Africa." *Journ. Ecol.*, **21**, pp. 415-435, map.

NICHOLSON, J. W.

1929. "The Influence of Forests on Climate and Water Supply in Kenya." Forest Dept. Pamphlet 2. Nairobi.
1930. "Note on the Influence of Forests on Climate and Water Supply in Uganda." Supp. to Kenya Forest Dept. Pamphlet 2. Entebbe.

PARKER, H. W.

- 1932a. "Two Collections of Reptiles and Amphibians from British Somaliland." *Proc. Zool. Soc. London*, pp. 335-367, figs. 1-3.
1932b. "Scientific Results of the Cambridge Expedition to the East African Lakes 1930-1931. 5. Reptiles and Amphibians." *Journ. Linn. Soc. London, Zool.*, **38**, pp. 213-229, figs. 1-10.
1934. "A Monograph of the Frogs of the Family Microhylidae." London. 4vo.
1936a. "Dr. Karl Jordan's Expedition to South-West Africa and Angola: Herpetological Collections." *Novit. Zool.*, **40**, pp. 115-146, figs. 42-43.
1936b. "Reptiles and Amphibians collected by the Lake Rudolf Rift Valley Expedition." *Ann. Mag. Nat. Hist. (10)*, **18**, pp. 594-609, figs. 1-13.

ROUX, JEAN

1936. "Reptilia et Amphibia." in Jeannel, R., "Mission Scientifique de L'Omo." **3**, pp. 167-190, figs. 1-4. Paris. 4vo.

SANDERSON, I. T.

1936. "The Amphibians of the Mamfe Division, Cameroons. — (2) Ecology of the Frogs." *Proc. Zool. Soc. London*, pp. 165-208, figs. 1-8, pl. i.

SCHMIDT, K. P.

1919. "Contributions to the Herpetology of the Belgian Congo based on the Collection of the American Museum Congo Expedition 1909-1915. Part I. Turtles, Crocodiles, Lizards and Chameleons." *Bull. Amer. Mus. Nat. Hist.*, **39**, pp. 385-624, figs. 1-27, pls. vii-xxxii.
1923. "Contributions to the Herpetology of the Belgian Congo based on the Collection of the American Museum Congo Expedition 1909-1915. Part II. Snakes." *Bull. Amer. Mus. Nat. Hist.*, **49**, pp. 1-148, figs. 1-15, maps. 1-19, pls. i-xxii.

THOMAS, H. B. and SCOTT, ROBERT

1935. "Uganda." London. 8vo.



EXPLANATION OF PLATES



PLATE 1

PLATE 1

Map of eastern Uganda and of Kenya Colony.

Designating the principal collecting camps mentioned in the itinerary. Except on the diagrammatic inset of the camps on Mount Elgon, railways are indicated by dotted lines. Landing at Mombasa, Loveridge took the railway to Kitale, thence by motor lorry through Kacheliba to Karita River from which a foot *safari* was made to Mounts Debasien and Elgon. Thence by truck from Bukori to Kaimosi, and afterwards on through Molo and Kikuyu to Nairobi.

The second part of the trip included visits to Kibwezi, Tsavo and Voi by rail, thence by truck to Mount Mbololo and back to Voi, rail to Mombasa, truck northwards along the coast to Mkowe, dhow to Lamu and Manda Islands, boat to Kililana and Mkonumbi, *safari* to Lake Peccatoni, Witu, Kau. Here four dugouts were procured for the journey up the Tana River to Wema in Ngatana. Returned down the river to Golbanti from whence a *safari* was made through Karawa and Gongoni to Malindi, where a truck was procured for the journey back to Mombasa.

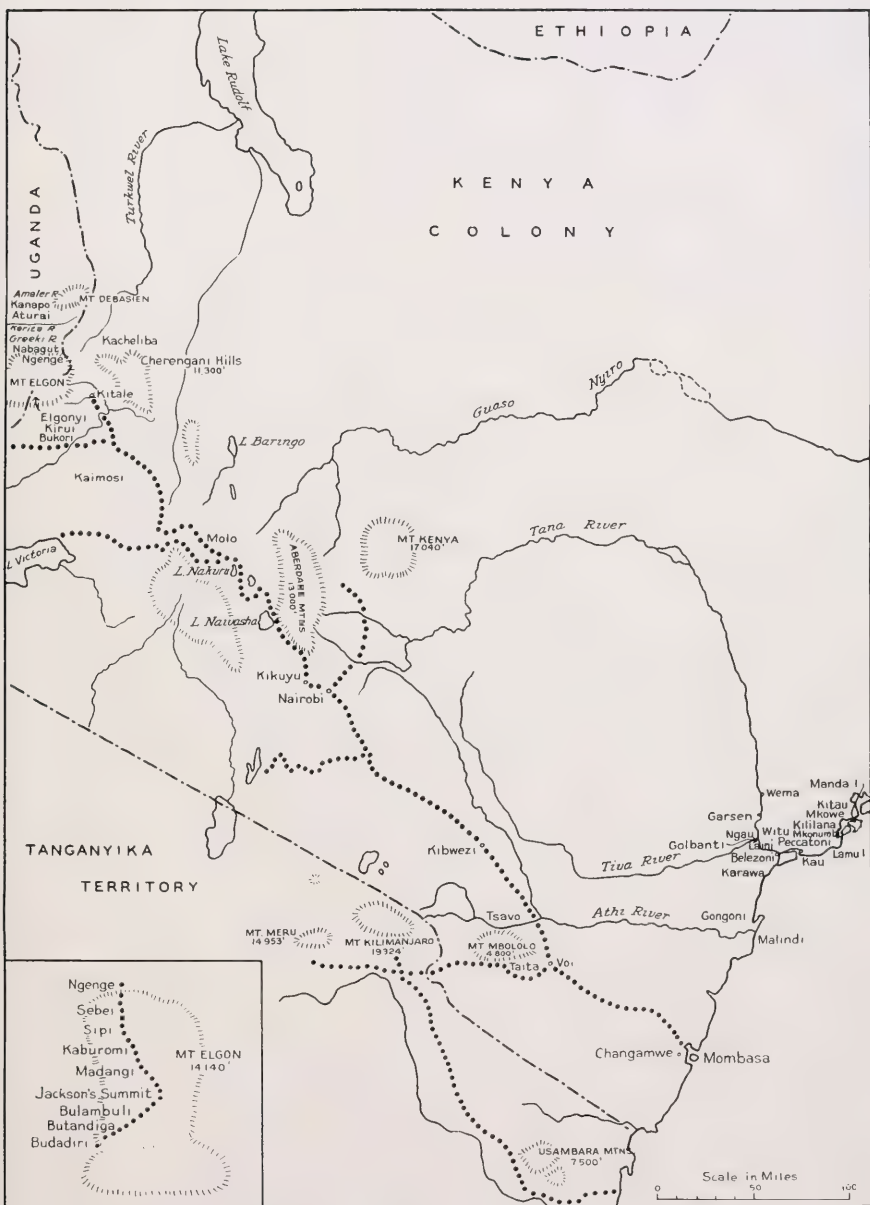


PLATE 2

PLATE 2

Fig. 1. A watercourse on Mount Debasien, Uganda.

With the single exception of the Amaler River, the illustration is typical of the state of all riverbeds on the western slopes of the mountains. Fully appreciative of the important part played by forests in the conservation of rainfall, the Uganda Government is carefully conserving the remnant of rain forest surviving on the summit of Mount Debasien. To the destruction of forest in the past, however, may be traced the swift run off which leaves a dry and stony watercourse throughout the greater part of the year.

Fig. 2. The Amaler River on western Mount Debasien.

This small stream provided the only running water on the western side of the mountain at the time of our visit in November 1933. In parts of its course the Amaler River was fringed with gallery forest, the resort of monkeys and a few surviving sylvicoline forms such as the gecko *Cnemaspis quattuorseriatus* of Kivu and Kenya. Six other watercourses which were visited were dry and stony beds where runner grass was a menace to the unwary walker. Both photographs were taken within fifty yards of our camp at 5,000 feet.



1



2

PLATE 3

PLATE 3

Fig. 1. Upland Savanna at 6,000 feet on Mount Debasien.

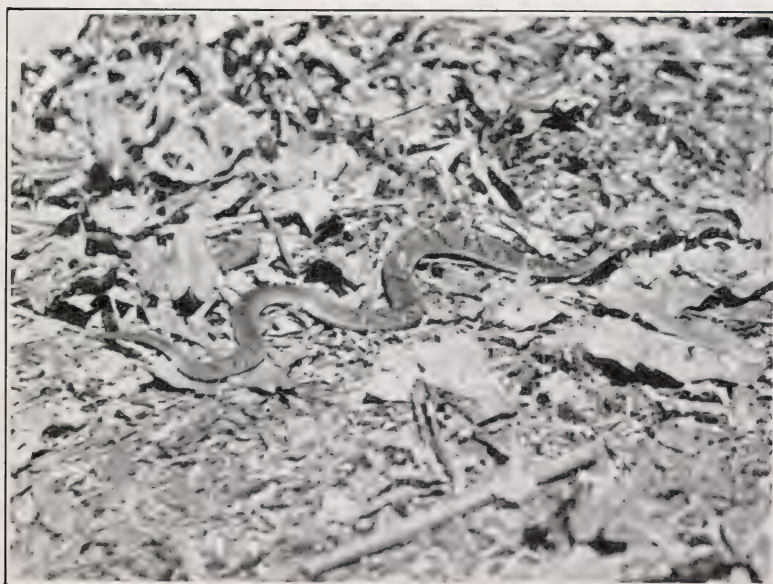
Much of the mountain's western slopes are covered with xerophilous vegetation consisting of a rank growth of grass, eight or more feet in height, and scattered, stunted trees. During the long dry season, the scorching rays of the equatorial sun extract all moisture so that a devastating conflagration occurs when the vegetation is fired by the native pastoralists. In East Africa this type of country is slowly replacing the cool and humid forests whose sylvicoline fauna is being supplanted by the less specialized types common to the savanna.

Fig. 2. A Green Adder (*Causus resimus*) at Kaimosi, Kenya.

This snake forms one of a small group of dominant species whose habitat is anomalous for they occur through several zones such as the coastal, savanna and rain forest. Perhaps swamps with an abundant supply of frogs are the governing factor in its distribution. The Green Adder ranges from Angola through the Central Lake Region across to the northeast coast. We captured several in the swamps at Mkonumbi, near Lamu, where they, like us, were in search of frogs. One had recently swallowed two of the allegedly aposematic *Phrynomerus bifasciatus*, whose black and scarlet livery is correlated with a secretion which acts as a powerful irritant.



1



2

PLATE 4

PLATE 4

Fig. 1. Cattle watering at the forest edge at Kaimosi, Kenya.

Owing to the foresight of Mr. F. N. Hoyt of the Friends Africa Mission a fine stand of virgin timber is being conserved on the mission property, while destruction of forest has been going on round about as the corollary of native immigration and settlement. The region, including the Kakamega forest, is of great zoölogical importance as being the eastern limit of the range of many West African forest creatures and type locality of eastern forms.

Fig. 2. Logging at Kaimosi, Kakamega, Kenya Colony.

At intervals all day long primitive ox-waggon went groaning past camp as they carried dismembered forest giants to the sawmills. There they were to be converted into the pit props and planks demanded by the thriving young gold-mining industry nearby. Africa is fast following in the footsteps of Europe and America in the exploitation of her forests, and it is poor consolation to the zoölogist to know that gums and blackwattle are being planted as a future fuel supply. Such plantations do not save the characteristic fauna which, for the most part, perishes with the primary forest.



1



2

Date Due

FEB 28 1994

**ACME
BOOKBINDING CO., INC.**

NOV 29 1983

**100 CAMBRIDGE ST. FET
CHARLESTOWN, MASS.**

Harvard MCZ Library



3 2044 066 303 520

